THE
LARYNGOSCOPE.

Vol. XXXV MAY, 1925. No. 5

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

FRACTURES OF THE MALLEUS.*

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The protective function of the meatus is more important than any function it may perform in reflecting sound-waves upon the drum membrane. The membrana tympani is liable to a number of injuries from without. These, while not directly interfering greatly with the function of hearing unless at the same time they affect deeper parts of the organ of hearing, usually expose the mucous lining of the tympanic cavity to the direct irritation of the external air, by perforating the membrane, and thus lead secondarily to inflammation and loss of hearing.

The healthy membrane will usually resist these forces, but of course a membrane which in any way is diseased by fatty degeneration, atrophy, and by calcareous deposits, or one prevented from assuming proper equilibrium, by a closure of the Eustachian tube, is extremely liable to yield to external violence above named.

Anatomically, fractures of the malleus belong to the rarer injuries of the organ for hearing. They are generally caused by direct trauma on the tympanic membrane by introduction of hard bodies into the meatus, by severe injuries to the head (fractures of the base), or by extraction of foreign bodies that have become wedged in the external canal. The fractures generally heal by the formation of callus, or the parts remain ununited. In either case the inferior

*Contributions from the Evans Memorial, No. 84, A-40.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Feb. 16, 1925.

broken end forms an obtuse angle with the superior end of the handle. On examination with Siegle's otoscope, the inferior ununited end of the fractured handle shows considerable motion, while the superior portion remains stationary.

As the literature on this subject is rather meager, it has seemed worthwhile to make a collection of the case histories of those reported. To this summary of the literature we add a single case which came under my personal observation.

Politzer, in describing this condition, mentions in his book a case of fracture of seven years duration, caused by extraction of a foreign body. The point of fracture was in the middle third of the shaft, the lower fragment forming an obtuse angle with the upper part. The range for ordinary voice had dropped to almost nothing and since the accident the patient had stammered noticeably.

Burnett in his book on Diseases of the Ear mentions a case that he saw in the polyclinic in Philadelphia, showing a malleus from which the lower two-thirds had been broken off, by endeavors to remove a foreign body many years before. He stated that the membrane had grown around the short stump of the manubrium.

Ballenger also cites in his book a case with the handle fractured about 1 m.m. below the short process, and the two ends reunited in nearly or quite their normal position.

Toynbee showed in his famous collection a specimen from a man who was 72 years old. The membrana tympani was very concave, with broad bands of adhesions, which completely covered the incus and connected all the ossicula to the inner wall of the tympanum. The inferior extremity of the malleus had been fractured. It showed distinctly that it was partially separated from the long process. This specimen is labeled No. 630.

Hyrtl's case was that of a prairie dog. He states that the fracture was in the first part of the malleus shaft, .3 m.m. beneath the neck of the bone. That it healed by an annular knot of callus which surrounded the bone. There was slight displacement inward of the lower fragment, with an unmistakable angle in the shaft about 160° opening outward. Although his case is that of an animal his comments are worth considering. He states that since the fracture can only have been caused by force acting on the outer surface of the drumhead drivng it inward, the fixation of the shaft in the plane of the drumhead explains the displacement of the broken shaft to the side, and the downward displacement of the fragments is self-explanatory. No tear or swelling was seen on the drum membrane. Had these been present, indicating a greater force, the fragments

of the shaft would have been driven so far into the middle ear that union with the upper portion would have been impossible.

The cases recorded in the literature together with their salient features can be presented most succintly in tabular form:

Grouping the case histories in the manner in which the fractures occurred seems wise, as the cause is the same in many of the cases.

GROUP I—TWIGS ENTERING THE CANAL.

Meniere's case was that of a gardner, who accidently thrust a twig of a pear tree into his ear (side not mentioned). At the examination there was a very extensive laceration of the membrane and the lower end of the malleus. When the patient held his nose and blew air into his cheeks the remnants of the drum membrane and the end of the malleus could be seen to move. With very little treatment healing took place slowly. Meniere stated that the drum healed over without "any special aid from art". In the discussion of Davis' case Milligan mentioned that in his case following the fracture the two fragments became as one with a marked area of callus forming at the line of union.

GROUP II—FOREIGN BODIES.

Frankel's case was in a three year old girl who had pushed a pebble into her ear in playing. At first, attempt at removal was made, and later by a physician with the patient etherized. Both attempts were futile. The next day at the hospital an attempt was made as on the day succeeding. In spite of the asepsis used, meningitis appeared and death followed on the seventh day. The autopsy is of interest in that it showed at the inner portion of the left meatus a grey-yellow, stony body, between its edge and the bone a small fissure entered the skull cavity. The wall of the meatus was covered with fatty debris and tenacious pus. After chiselling away the roof of the tympanic cavity the parts were found filled with pus and lymph exudate. The ossicles were dislocated with respect to each other and the surrounding bony structure. The shaft of the malleus and the long shaft of the incus were separated, so that the former was directed toward the labyrinth wall. The head of the malleus showed a fracture of a hair's breadth. The tympanic membrane was wholly destroyed and the walls of the meatus lacerated. The stapes was separted from the oval window lying between the foreign body and the labyrinth wall, its head toward the mouth of the tube. In the region of the fenestra ovale an irregular quadrilateral bone fragment had separated itself. The foreign body was so firmly wedged that it could not be removed without damaging the skull.

TABLE 1

Reporter	Year	No. of Cases	Sex	Age	Type of Accident Group	Unconsciousness	Tinnitus	Vertigo	Deafness	Right Ear	Left Ear	Rupture Drum Membrane	Fracture Malleus	Suppuratio	Complications	Treatment	Autopsy	Remarks
Meniere	1856	1	M	0	I	0	0	0	1	1	0	1	1	0	0	1	0	
Toynbee, J.	1857	1	M	72	0	0	0	0	0	0	1	1	1	0	0	0	1	Anatomical Specimen
v. Tröltsch, A.	1869	1	M	0	III	1	1	1	1	1	0	1	1	0	0	1	0	
Weir, R. F.	1870	1	M	32	III	1	1	1	1	1	0	1	1	0	0	1	0	Non-union
Hinton, J.	1874	1	M	0	III	1	1	1	1	1	0	1	1	0	0	1	0	
Sajous, C. E.	1879	1	M	19	II	0	1	1	1	1	0	1	1	1	0	1	0	
Bürkner, K.	1879	1	M	19	V	0	1	0	1	1	0	1	1	0	0	1	0	
Frankel. E,	1879	1	F	3	II	1	1	0	1	0	1	1	1	1	1	1	1	Meningitis Fatal 7 days
Steinbrügge.	1880	1	M	19	III	0	1	1	1	1	0	1	1	0	0	1	0	
Moure, E. J.	1883	1	M	20	V	1	1	1	1	1	0	1	1	1	0	1	0	
Eitleberg, A.	1885	1	M	38	V	1	1	1	1	1	0	1	1	1	0	1	0	
Kirchner,	1886	3	①M	23	IV	1	1	1	1	1	0	1	1	0	1	1	1	Multiple fractures
			②M	60	IV	1	1	0	1	1	0	1	1	0	0	1	0	
			②M	10	IV	1	1	1	1	0	1	1	1	0	1	1	0	Labyrinth Involvement
Hepburn, N. J.	1887	1	M	0	II	0	1	1	1	1	0	1	1	0	0	1	0	
Rohden, R.	1887	1	M	26	III	1	1	1	1	0	1	1	1	1	1	1	0	Labyrinth Involvement
Trautman.	1893	6	0	0	III	0	0	0	0	0	0	6	6	0	0	0	0	No history of the cases given
Pritchard, U.	1896	1	M	44	IV	1	1	1	1	0	1	1	1	0	1	1	0	Fractured Skull
Szenes, S.	1898	1	M	32	V	1	1	1	1	1	0	1	1	1	1	1	0	
Müller, R.	1898	1	M	61	III	1	1	1	1	1	0	1	1	1	1	1	0	Right Facial Paralysis
Packhard, F. R.	1899	1	M	39	II	1	1	1	1	0	1	1	1	1	0	1	0	
Allport, F.	1900	1	M	36	II	1	1	1	1	1	0	1	1	1	0	1	0	
Ruttin.	1908	1	0	0	V	1	1	1	1	1	0	1	1	0	0	1	0	
Davis, E. D.	1913	1	M	39	IV	1	1	1	1	1	0	1	1	0	1	1	0	
Total																		
	1856		M–21	3yrs.														
			F– 1															
22	1913	29	U– 7	72		17	21	18 ④	22	17	6	29	29	9	8	22	3	

GROUP III—PEN HOLDERS AND HAIR PINS.

Sajou's case was seen in Turnbull's clinic. It was a teamster, age 19 years, who two weeks before had been injured by a pointed pen-holder penetrating to the bottom of the canal and perforating the membrana tympani. There was some dizziness and slight hemorrhage, but very little pain at the time of the injury. That night, however, he had excruciating pain accompanied by severe tinnitus. A few drops of strong nitrate of silver solution were dropped into the canal. During the third day the pain and tinnitus subsided with the appearance of a purulent discharge, which lasted for ten days. The auricle was red and slightly swollen and painful on pressure; the meatus was swollen and partially occluded and filled with whitish-yellow pus. The canal was so macerated that no details of the membrane could be seen. The Eustachian tube was involved, but strong blasts from a Politzer bag cleared the tympanum and caused the ear to whistle and produced much pain. After three weeks treatment, the details of the membrane could be made out, in the center of which was a crescentic rent involving about one-third of its diameter. Tympanic secretion oozed through this opening during forcible inflation. Each inflation caused a flap to swing out, and with it a small fragment of the lower portion of the handle of the malleus. This act caused sharp pain and a marked increase in the tinnitus. The treatment was suspended after the fourth week. An occasional inflation prevented adhesions of the fractured malleus and the torn membrane to the promontory. The hearing returned in three months time, while the appearance of the membrane was normal with the exception of the contour of the handle of the malleus and the light cone. The line of the handle could be traced to within a short distance of its end at the umbo. At the point of union there was some hyperostosis, but was probably the width of the bone out of its proper line. From the thickened point of union a narrow reflex extended, with its fan-shaped extremity toward the periphery of the membrane. With a Siegle's otoscope the membrana tympani could be drawn outward, and with it the handle of the malleus with its united fragment, while the increase in width of the fan-shaped projection of light proved the perfect action of the parts, which moved as a whole.

While in v. Troltsch's case seen a year after the accident the handle of the malleus assumed a peculiar position and it appeared uncommonly thick and prominent at a point immediately under the processus brevis, turning on its axis at this point when it moved. Packard's case recovered in six weeks following suppuration. The

two fragments healing at an angle of 45.° The hearing returned to normal and the tinnitus disappearing completely. The patient of Hepburn's, on the other hand, had almost complete loss of hearing, the drum healing but leaving the malleus handle apparently twisted upon itself. A false union was present, while in the uninjured ear a dislocation of the incudo-stapedial joint could be seen through an opening in the drum membrane.

GROUP IV—FALLS.

Kirchner's case was that of a suicide, age 23 years, run over by a train. He was thrown to side, suffering from numerous fractures. He died in twenty-four hours, the autopsy showing in the left ear a ruptured drum with a fracture of the malleus, the fragments separated .5 m.m. He explained the fracture by the blow to the zygoma and the transmission stress through the fibres of the drum membrane. The second case showed a longitudinal fissure in the drum with fracture of the malleus. No union took place, although the hearing seemed as good as before the accident. The third case was in a boy falling six feet, later on showing a callus at the point of the fracture. A labyrinth infection followed, destroying the hearing in that ear.

In Trautman's six cases he saw extensive callus formation in only one of them. On the other hand, in Rohden's and in Müller's cases some callus was noticeable, without mobility of the fragments. In Müller's case a facial developed and also showed a fracture of the external canal wall. Both cases recovered without undue loss of hearing and without disturbance to the labyrinth. In Allport's case following the suppuration, deafness and tinnitus persisted as well as the dizziness for a very long period of time. In Pritchard's and Weir's cases there was nonunion of the fragments. When the Valsalvian experiment was performed the fragments rotated and came into apposition in each case. Davis' case, while also a fractured skull, showed three months after the accident a small piece of bone attached to the drum, on removal, showed it to be the head of the malleus and two other smaller pieces that were removed seemed like the two crura of the stapes. There was no perceptibie loss of bone conduction, the deafness being of the middle ear type.

GROUP V—BLOWS.

Moure's case received a blow on the side of the head, losing consciousness and bleeding from both ears. On recovery the patient was apathetic, although his general appearance was good. There was facial asymmetry, while the muscular strength was subnormal. The general sensibility was decreased, with hyperasthesia on the right

side of the face. The hearing was impaired, especially on the right, a loud voice being heard only close to the ear, the bone conduction through the skull was practically destroyed. The patient complained of extreme tinnitus, while walking with the eyes closed was very difficult indeed. The vertigo attacks were very violent, but without any gastric upset. The drum was thickened and adherent to the promontory, while at the incudostapedial area could be seen a laceration of the drum, and at the middle third of the malleus, with the use of Siegle's otoscope, much motion took place without any apparent callus formation. Eitleberg's case, on the other hand, three weeks after the accident showed a healed drum membrane and a callus on the handle of the malleus, the tinnitus only remaining, which was very bothersome. Hinton's case as well as that of Ruttin were quite simple, healing promptly without much disturbance to the hearing. Szenes' case, however, showed a rupture of the auditory canal wall. The case remained in bed for two months, due to the extreme vertigo, lapses of consciousness and marked headaches. Following the suppuration, a cicatrix formed, the malleal handle remaining in two unequal fragments. The fracture finally united, showing an obtuse angle at the point of union together with a calcereous deposit in the drum membrane. The hearing on the last examination had returned nearly to normal. Burkner's case showed a right angle of healing which was more pronounced when Siegle's otoscope was used. The drum was so thin that the shaft of the incus could be seen as well as the posterior crura of the stapes.

The report of the single case that has come under my personal observation is as follows:

Case 1. Mr. W. W., age 43 years, while hunting in the woods and passing through a thicket, a small branch of a sapling brushed his right ear, at the same time that he tripped to the right over an unseen obsrtuction. He immediately felt excruciating pain in the right ear and was conscious of an explosive like noise in his head causing distinct unsteadiness as he arighted himself. This disturbance forced him to sit down immediately so that he might relieve the nausea. He vomited twice within the next four hours, while the vertigo lasted with some abatement for several days. He had a marked tendency to go to the right unless he had a cane. On swallowing a peculiar hollow sound was noticeable and his deafness was very marked, but as he expressed it "there is so much racket in my head, I am unable to hear anything else".

The intense pain, together with the dizziness, caused him to ask me to examine his ear. This examination showed no signs of injury

to the canal, but did show clotted blood in the canal. The drum membrane was injected especially in the superior portion, while inferiorly running across the drum was an open perforation, the lower edge of which and just above the umbo showed a separate piece of the malleus. With Valsalva technique the edge of the handle appeared, while the edges of the perforation held by clotted blood. The tuning forks showed the Weber test localized to the right side, a negative Rinné, and the watch only perceptible in contact with the head. As I had his previous records I found that the loss of hearing was about 80 per cent.

The treatment that he received was absolute rest in bed, liquid diet, catharsis, elevation of the head to about 45,° the instillation of 10 per cent argyrol into each nostril several times daily, and caution to him not to blow his nose for the first 24 hours. The canal was wiped out with 70 per cent alcohol, dried with sterile gauze, a small amount of boric powder blown into the canal and a sterile wick, together with a sterile pad and bandage to the head. His convalescence was quite uneventful, the drum healing in two days without suppuration. The nausea and vomiting did not bother him following his return home, but the tinnitus lasted for several months gradually growing intermittent and finally ceasing altogether. Three months after the injury, with the Siegle otoscope, it did not seem to me that union was particularly firm although a callus was noticeable just above the umbo. Six months after the accident, the union was firm, but there was an appreciable obtuse angle between the united ends of the handle. The hearing had returned to about what it was previous to the accident, the Eustachian tube was patent and there was no apparent adhesion of the drum membrane to the promontory.

Generally the prognosis in these cases is very favorable indeed unless there are complications such as a fractured skull. As to the treatment, however, I believe that the least the case is disturbed the better the result will be. It is impossible to bring the fragments into apposition and to hold them in place. Consequently a small amount of dry powder insufflated into the canal, together with dry wicks, or no wicks at all, seem to be the best treatment. If the middle ear becomes infected dry wipes without the use of powder is the advisable procedure. Should the discharge become pus, then it would be necessary to syringe the canal carefully, followed by complete drying and dry wicks placed in the canal. Generally, however, the convalescence is quite uneventful.

SUMMARY.

1. The rariety of the fracture, as I have found only forty-four cases recorded in the past sixty-eight years.

2. The favorable prognosis; the simplest treatment seems to be all that is necessary to restore good function in a very short space of time.

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CONTROL OF INTRACTABLE SINGULTUS (HIC-COUGH) THROUGH THE NASAL (SPHENOPALATINE-MECKEL'S) GANGLION.*

DR. CHARLES SIXTUS REHFELDT, St. Louis.

The comparatively recent work of Sluder may be termed nasal neurology, especially the role played by observation and treatment to the nasal ganglion in and for various manifestations of intra- and extranasal disease and symptoms. I wish to add another striking result of cocainization of the nasal ganglion.

Peter D., age 32 years, single; occupation, tailor; height, 7 feet, 5½ inches; weight, 152 pounds; well nourished.

Previous Health—Suffered a slight attack of influenza in 1919, after which he had headache often of three days' duration, most often "lower half", left side. Two years ago headache disappeared without treatment. His history is negative as to G. C. and lues.

Present History—Patient consulted me Nov. 14, 1924. He had a feeling of malaise Nov. 12, 1924, followed by a distinct chill, also fever of about twenty-four hours' duration. Immediately after chill, singultus (hic-cough) developed. Patient complained of headache and pain of all parts of body with exception of hands and feet. Particularly severe was pain over sacrum. He had a sensation of burning in pharynx and larynx. He could not sleep nor eat on account of continuous hic-cough. Temperature 98.° Pulse 100. Blood pressure 120/70. Cardio-vascular—lungs: examination was negative as to localization of infection. Urinalysis negative. Bowel movement normal. Nasopharynx and larynx showed hyperemia. He had distinct hyperplasia of both posterior ends of middle and inferior turbinates, also of plica septi. Lingual tonsils were lobulated and hypertrophic. Hyperplasia of post-ethmoid and sphenoid area is present. Diagnosis, la grippe.

Treatment—Thinking the singultus due to gastroenteric functional disturbance plus possible toxemia, I gave calomel, rhubarb and soda. Patient returned to office Nov. 16 very weak and exhausted. He had had very little nourishment and no sleep for more than fifty hours, on account of continuous hic-cough. The nasal ganglions

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Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 16, 1925.

were cocainized, waiting about ten minutes the hic-cough did not stop; I then inspected and found the hyperplasia had made a change in the contour of the posterior tips of the middle turbinates; a proper replacement of applicators showed marked and immediate cessation of hic-cough, which did not return. Patient telephoned next morning that hic-cough had not returned. Nov. 17, patient reports he slept most of the day. No hic-cough.

The advantage of stopping intractable hic-cough is obvious for all experienced medical practitioners; and especially by means of small cocain applications, instead of large doses of morphin, or other opiates.

Case 2: Mrs. E. P., white, age 42 years, was married twenty-three years. She has two normal children. Occupation, housewife. Height, 5 feet, 8¾ inches. Weight, 148 pounds.

Previous Health—Robust during infancy and childhood. Patient suffered much pelvic pain and discomfort, diagnosticated as ovarian inflammation and fibroid uterus.

The first attack of hic-cough occurred in March, 1924, without apparent cause, lasting from Thursday to the following Monday. The family physician was consulted, and after much medication and other treatment aromatic spirits of ammonia was finally given the credit for cure; its use in subsequent attacks was of no benefit.

Over a period of the last ten months, the patient has had attacks of hic-cough, the duration of which varied from 4 to 72 hours. There was no interval of freedom from hic-cough longer than seven days. The patient was under good medical and surgical care during this time and received treatment for, and at every recurrent attack.

Careful examinations were made and many consultations held. Patient was studied in several hospitals; all examinations revealed no pathology with exception of the pelvis as above stated. She got no relief. Relief was expected from surgery, and on Oct. 8, 1924, patient had the fibroid uterus removed under general anesthesia and part of one ovary resected. After the operation she had the longest respite from hic-cough—seven days. All manner of treatment was resorted to—manipulations, diet, drugs—subcutaneous injections of adrenalin, camphor in oil, ether, cacodylate soda, and various bacterial derivatives, atropin, opium, morphin, etc., intravenous injections of ether, camphor and also bacterial derivatives, the latter in such doses as to cause rigors and fever, in one instance it was followed by several hours unconsciousness and "near" death.

All this treatment was in vain with the exception of occasional relief from large doses of morphin hypodermatically.

Present History—Patient has been hic-coughing continuously for more than fifty hours, Dec. 4, 1924, to Dec. 6, 1924. The hic-cough on count was 24 to the minute. The patient received two hypodermics of morphin, Dec. 5, at 11 p. m., without relief.

She consulted me at my office Dec. 6, 1924. The usual physical examinations negative; pulse 72; temperature 98;° blood pressure 130/95. The present weight is 148 pounds. March, 1924, it was 172 pounds. Rhino-laryngological examination showed postnasal mucosa darker in color compared to anterior nasal mucosa. The lingual tonsil was hypertrophic.

Treatment—Having had such a remarkable result in Case 1, I tried to determine if cocainization to any other nasal areas or nerves would give relief. Bilateral cocainization of anterior ethmoidal nerves was made. After an elapse of 14 minutes (with the count of 24 hic-coughs to the minute), no diminution nor relief was had. Cocainization to the nasal ganglion was then made. After 4 minutes the hic-cough was not so violent, also the interval of hic-cough was lengthened (that is, the count was about 12 to the minute) and gradually decreased in severity and number so that at the end of 6 minutes hic-cough ceased entirely, and did not return.

May 20, 1925: Additional notes and observations in the case of Mrs. P. of intractable hiccough, are especially interesting and appended hereto:

Patient on account of residing sixty miles distant did not return regularly for treatment and observation until Feb. 25, 1925.

Patient was without return of hiccough from first treatment, Dec. 6, 1924, to Dec. 16, 1924. When hiccough returned patient was given hypodermic injection of 1 gr. of morphin by her local physician; this was repeated to stop hiccough, which also was a physical strain that kept the patient in bed most of the time.

Feb. 25, 1925. Patient returned with hiccough of 36 hours' duration; controlled by bilateral cocainization of the nasal ganglion.

Mar. 2, 1925. Treatment. No return of hiccough.

Mar. 12, 1925. No return of hiccough. Treatment—cocainization of nasal ganglion bilateral, and application of 50 per cent solution nitrate of silver to nasal ganglion area only.

Mar. 25, 1925. Patient returned; hiccough of 12 hours' duration; I also noticed acute inflammation and edema of area previously touched by 50 per cent silver nitrate solution of left side only; hiccough seemed greatly provoked by slight touch as applicator brushed over left nasl ganglion area; this treatment required thirty minutes for complete control.

Mar. 29, 1925. No hiccough since last treatment. Left nasal ganglion are a macroscopically normal. Upon passing applicator over left nasal ganglion area; this treatment required thirty minutes After cocainization was complete hiccough was again controlled. On account of the observation that the left nasal ganglion was sensitive to slight trauma in producing hiccough at will, I conclude to confine my treatment to this ganglion only.

Subsequent attacks of hiccough were controlled by treatment to the left nasal ganglion only.

Over this period of treatment, patient has had relief of hiccough no less than ten days and as many as twenty-one to thirty-one days between attacks. Since observing the extreme sensitiveness of this left nasal ganglion area the interest of this case has increased.

The injection of the nasal ganglion has therefore been postponed. The patient has gained in weight, health and strength.

It is interesting to know that in Case 2 the hiccough could be produced by mechanical irritation of the left nasal ganglion.

FOREIGN BODY IN ESOPHAGUS.*

Dr. Philip S. Stout, Philadelphia.

J. H., Philadelphia, age 3 years, white, male.

Family history: Mother and father living and well. Previous history: No illness. Chief complaint: Swallowed penny. Brought immediately to hospital, Aug. 25, 1924. Began vomiting. Heart and lungs normal. X-ray showed the position of the coin, in the esophagus just below the suprasternal notch. Efforts to remove the coin were made the same day but were futile.

Operation Aug. 26, 1924, Dr. Stout. With a Jackson's child-size esophageal speculum, combined with the direct fluoroscope examination, the penny was easily found and delivered by way of the mouth. Time, less than three minutes. The child left the hospital the next day. Pulse and temperature normal.

Medicine: Bicarb. soda gr. X, every hour for four doses; also, Morph. gr. 1/16; At. S. gr. 1/400, Hypd., one hour before operation.

*Read before the Philadelphia Laryngological Society, Dec. 2, 1924.
Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 10, 1924.

Comment: Doing this operation in the X-ray room with fluoroscope examination proceeding while the penny was found and grasped made the operation so easy that it was really a delight to do it. The esophageal speculum is one of the most remarkable of all the instruments that Dr. Jackson has devised.

Disadvantages in using the fluoroscope: The room must be pitch dark, which may frighten a child—and it is a little difficult to tell the condition of the child. A small flashlight helps to see the face. Again, you might come in contact with some part of the wiring or the apparatus and get a shock. Suggest not to move around too much in the dark and have everything ready before turning out the much in the dark and have everything ready before turning out lights.

Advantages in using the fluoroscope: Most foreign bodies in the esophagus are opaque or can be made so to the fluoroscope, so you can see when your speculum gets near the object; therefore, riding over it is not likely to occur—if it starts downward while you are inserting the instrument this also can be seen. You will not spend an hour looking for the foreign body that has gone down to the stomach. If there is more than one object this can also be seen. Finally you can see the object come up with the speculum, or, if it slips off, you can see it in its new position.

This is a method that any laryngologist can master and do in the hospital where there is a fluoroscope. No specially trained assistants, except the Roentgenologist, are required.

Note: Since the above was written we have used this method on another child, with a Red Cross button in the esophagus, just below the suprasternal notch—S. M., age 5 years, white, male.

Medical Arts Building.

PHYSIOLOGY OF THE TONSILS.*

DR. DAVID NUSSBAUM, Philadelphia.

It might seem at the first glance, that all that could have been told about the tonsils has been told, and that any further discussion of this subject is an unnecessary waste of time and energy; but this is far from being the case.

It should be emphasized, that in our own day, the clinical appearance of the tonsils is still the sole criterion and determining factor for their removal; the scientific aspect of the case being sadly neglected, or entirely overlooked. This policy has led to the indiscriminate enucleation, at sight, so to say, of any and every tonsil and brought the operation into some disrepute, so much so that some very prominent and dependable men speak of a massacre of the tonsils.

If it is appreciated that a tonsillectomy may at times assume the proportions of a major operation, and that most serious morbidity and even mortality may follow in its trail, it becomes obvious that careful consideration should be given this subject and precise scientific data should replace the subjective intuition of the examiner.

Three questions dominate the field of the tonsilar problem, namely: what is the function of the tonsil, if any; what are its relations to the systemic infectious diseases; and what are the end results of carefully selected, carefully done and postoperatively well treated tonsillectomies.

Until a satisfactory answer is given these pertinent questions, the tonsils will remain what they are today, an unsolved problem and the subject of endless discussion.

For a long time, investigators have endeavored to clear up the uncertainty surrounding the physiology of the tonsils. On the one hand they have ascribed to them many imaginable functions; while on the other they have considered them atavistic organs, without any function whatsoever.

Only in the last few years has this controversy, seemingly, been settled and some definite understanding reached.

The oldest known theories considered the tonsils to be a secretory gland, whose secretion contains: (1) either an amylolytic ferment to help digest the intaken food (Rossbach); (2) or plain mucus for lubricating the passing food (Bossworth); or (3) an inert fluid to moisten the inhaled air (Mink).

None of these theories have any standing in the light of our present day knowledge. The same applies to that other opinion,

*Read before the Medical League of Philadelphia.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Feb. 2, 1925.

ascribing to the tonsils the function of aspirating the excess of saliva, tears and nasal secretions and returning them to the general circulation.

Another group of investigators maintain that the histological make up of the tonsils is the most important feature in determining their function, and they consider them blood building organs; for the reason that their parenchyma is composed of lyphoid follicles, with germinal centres, where mitotic changes are seen to take place. In this way, young white blood cells are continuously being born and thrown into the blood stream (H. Allen, G. B. Wood).

The premises of this theory are correct; young lymphocytes do originate in the tonsils—their number is larger in the hyperplastic, and smaller in the atrophic type—but what becomes of them is mere speculation. Most of them emigrate through the epithelium, to the free tonsilar surface and into the crypts; many remain in the parenchyma and a small number will find its way into the blood stream.

At any rate, the contribution of the tonsils to the white cells of the blood is so small as to be of very little value.

H. Allen is also of the opinion that the hyperplastic tonsil has an increased internal secretion, which works harm in the body of children, causing them to be below par mentally and physically.

Massini injected a tonsilar extract and claims to have observed a rise in the blood pressure; Scheier, doing the same thing, found a drop in the pressure; while Pugnat (Belgium) could see no effect whatsoever on same.

The next two theories to be mentioned lay the main stress on the clinical side only, and are for this reason of great practical value. The paramount questions being: are the tonsils able to guard our organism against infectious diseases, or do they help in spreading them?

One group of investigators represent the standpoint that the tonsils are acting as a first line of defense; while another large number of men take the opposite view, namely: they blame anything and everything on the tonsils, which they consider a great source of mischief.

Brieger and his pupil, Görke, are the originators and defenders of the so called defense theory. They claim: (1) that the tonsils possess a defense mechanism of their own, which renders them immune against infections, and (2) being situated at the most dangerous point, at the beginning of the alimentary and respiratory tract, they are in a position to act as guard against the invasion of infectious diseases, which otherwise would gain in intensity and in frequency, should the tonsils be absent.

As clinical proof Görke offers the fact that in childhood, where infections are at their height, the tonsils are mostly in a hyperplastic state, and, that after the human body acquires immunity against these very infections, they undergo a process of involution, as is the case in adolescent life.

Furthermore, it has been histologically proven that the normal tonsils absorb neither liquid, nor solid substances from the mouth, except when the epithelium of the tonsils is injured. Even in this contingency the penetrating substances or germs advance very little into the interior, on account of their being checked by the peculiar defense arrangements of the tonsilar parenchyma.

This mechanism consists of a lymph current—loaded with lymphocytes—running continually through the tonsil, from inward outwards, and in this way mechanically counteracting the onrush of germs, whose direction would be from the surface towards the interior; at the same time the phagocytic action of the leucocytes accomplishes the rest.

The existence of such a lymph current is purely hypothetical, reasoned out by the fact that the germinal centers produce only lymphocytes and no polynuclear leucocytes, and that these lymphocytes have no locomotion as do the former.

Since they penetrate the epithelium of the free tonsilar surface in such great numbers, as to even disrupt its continuity, there must of necessity be a stream present to move them along, otherwise there would be no possibility for them to reach the surface.

A number of objections have been raised against his theory, the most important being: (1) The lymphocytes do have an ameboid movement; it is much slower than that of the leucocytes, but none the less they are able to change their position and do not require a special stream to carry them; (2) their greatest number is found in the crypts, where—on account of their tortuous course—the pressure against the current is the highest; (3) nobody has as yet experimentally demonstrated the existence of such a current; (4) it could be argued that the infectious diseases of childhood are disappearing later in life, not on account of the acquired immunity, but on account of the involution of the lymphoid tissue. Or, to put it in another form, the reason that adults are less subject to tonsilar inflammation is due to the fact that the tonsils and the rest of the surrounding lymphoid tissues are undergoing a process of atrophy later in life.

Quite similar to this theory is the contention of some older and still more recent writers, foremost among them Schonneman, of Berne, that the tonsils are regional lymph glands draining the nasal cavities. They offer as proof the fact that after thorough treatment of the nose, the recurrent attacks of tonsillitis will subside.

The reason for so many hypotheses, each contradicting the other, though propounded by men of the highest standing, lies in the fact that the tonsils are segregated from the rest of the lymphoid tissue of the upper respiratory tract, treated as entirely different organs and special functions attributed to them which they do not possess.

The mucosa of the nasopharynx, pharynx, mouth and upper part of the larynx is infiltrated with leucocytes, either imbedded in the superficial layers as discreet masses, or protruding above the surface in the form of small, oval-shaped nodules or in conglomerations of the latter into sharply circumscribed bodies in the form of tonsils and adenoids. The entire complex of lymphoid tissue—in whatever form it appears—is called the lymphoid ring of Waldeyer.

The tonsils have long been recognized as a conglomeration of lymphoid tissue, but confusion arose from the fact, that having the same cellular structure as the regional glands, they were considered as such and theoretically given the same function. Piersol, classifies them with the patches of Peyer, and gives them an intermediary position between typical lymph glands and mere diffuse masses of leucocytes.

In 1920 Schaffer, of Vienna, was the first one to draw a sharp line of differentiation between the characteristics of the two, and has thus opened a new field of research into the physiology and pathology of the tonsils.

He drew attention to the fact that lymph glands are, without exception, interposed in the pathway of a lymph vessel, whose lymph they filter; while the lymphoid tissue of the upper respiratory tract, including the tonsils, are peripherally located and imbedded in the mucosa, close to its epithelial layer.

A typical, regional lymph gland will therefore have: (1) incoming stems, called vasa afferentia, to drain the particular region to which they are distributed, and (2) outgoing branches, vasa efferentia, for the purpose of carrying the leucocytes into the blood stream.

The tonsils, being peripheral lymphoid tissue, don't need and in reality have no such afferent vessels.

Lymph glands have a compact cortical substance, traversed by a system of channels in which the lymph is flowing; while the tonsils are in the main, invaginations of mucous membrane, called pits or crypts, around which is crowded the lymphoid tissue and the germinal follicles. Each pit with its surrounding lymphoid mass constitutes a unit, and a variable number of such units, separated by trabeculae of fibrous tissue, make up the tonsil.

It is therefore obvious from Schaffer's findings—which meet with general approval—that all component parts of Waldeyer's ring, including the tonsils, have no vasa afferentia. Consequently they are lacking the first requirement of a typical lymph gland, and therefore cannot be considered a filtering station. They are rather, owing to their peripheral location, to be considered the point of origin for the lymph current.

These purely histological findings have been subjected to a thorough physiological and clinical test by F. Schlemmer, of Vienna, with the object of correlating the anatomy with the experimental and the actual clinical facts.

Moribund patients, whose expectancy of life was considered almost nil, were injected with a sterile dye in the mucosa of the floor of the nose, septum and turbinates, also in the gums, hard and soft palate and both pillars; the specimens were examined post-mortem, and in every case the cervical glands draining this region, including the peritonsilar tissues, were impregnated with the dye, the single exception being the tonsils themselves.

The same line of investigation was followed out in the cadaver of recently demised patients, and identical results obtained, *i. e.*, the tonsils were found free from any dye particles, while everything around them was completely infiltrated with the latter.

Lastly, patients whose tonsils and adenoids were to be removed, were injected in the same way as mentioned above, and then operated upon at intervals of between six hours and three days. In the entire series of these cases not a particle of the foreign substance could be found anywhere in the tonsilar parenchyma; while the neighboring tissues and the regional cervical glands were actually swamped with the coloring matter.

From these paintaking and elaborate experiments, based on Schaffer's theoretical principles, Schlemmer draws the conclusion that neither the tonsils nor the rest of the lymphoid tissue situated in the nasopharynx, pharynx and mouth possess any incoming or afferent vessels, and cannot, therefore, be classed as typical regional lymph glands. Consequently, the assumption and teaching that they give protection to the human body, in helping to stave off infections is based on speculation, but not on real facts.

Another controversial issue concerning the tonsilar function was raised by the question as to where the lymph originating in the tonsils is flowing to; and here also two opposite viewpoints are holding the field. Some claim the direction is centrifugal, towards the mouth and pharynx, while the others hold that it is centripetal, towards the glands of the neck.

In 1914, Henke, of Konigsberg, published the results of his experimentations and reached the conclusion, that the tonsils are performing the function of elimination, of ridding the system of all foreign elements, carried to them by the centrifugally directed lymph current.

His findings were successfully disputed by other research workers, who pointed to the positive conclusions of prominent anatomists, that the tonsils are draining into the uppermost deep cervical glands. These are seated deep in the neck around the large blood vessels, at the junction of the common and internal jugular veins, corresponding topographically to the level of the horn of the hyoid bone, where it meets the anterior border of the sterno-cleido-mastoid.

The decision at issue is of great consequence, as it is important to know if the tonsils are helpful to the human economy, by ridding it of injurious elements, or if they cause harm by permitting the invasion and passage of virulent germs, as would be probable from the centripetal course of the lymph current.

Schlemmer has endeavored to answer this question by a series of experiments, which solve it in a most satisfactory and scientific way.

He selected patients who needed a tonsillectomy and injected his sterile dye between six hours and several days before the operation, prepared slides from the freshly enucleated tonsils and examined microscopically a great number of consecutive serial sections. A group of patients had their free tonsilar surface, only painted; in a number of others he injected under the epithelium of the free oral surface, while in many others, behind the capsule, in the same way as in local anesthesia. Lastly, he applied the same procedure to patients suffering from acute inflammation of the tonsils and from peritonsilar abscess.

The results he obtained are very interesting and in keeping with the anatomical facts already mentioned. In all cases where the injection was given under the epithelium and behind the capsule, the dye particles were traced in the lymph spaces of the fibrous septa and of the capsule. They could be seen taking a centripetal course towards their respective regional glands in the neck, which became infiltrated with the dye; while the epithelium of the tonsilar surface and of the crypts, the contents of the latter, and the lymphoid tissue of the tonsils themselves failed to show one particle of the injected dye.

The identical results were obtained in the cases where he dealt with inflamed tonsils, showing clearly that in health as in disease the lymph current is taking a centripetal course, under all circumstances.

Finally, where the dye was only painted on the surface, it could

be seen penetrating as far as the crypts, but not one granule pierced the epithelial covering, nor got further into the tonsilar tissue.

One more important question was waiting for an answer, namely: the relation of the lymph capillaries to the crypts. Schlemmer succeeded, after a series of technically very difficult and intricate experimentations, to demonstrate, that the tonsilar capillaries are a closed network, with blind cul de sac endings, without any opening into the crypts. Therefore, the possibility of a centrifugally directed lymph flow into the crypts and through them into the mouth is positively excluded.

On the clinical side, it has been observed, that in cases of malignant growth involving the nose, maxillary sinuses, hard and soft palate, gums, pillars and even the tonsilar capsule, the tonsils remain free from direct or metastatic involvement, like an island in the midst of a sea of carcinomatous masses, while the regional glands are affected very early in the disease.

We now come to the most popular theory of the day, the one which denies the tonsils any defense or resistance power, and on the contrary considers them the invasion point and transmission station for all sorts of infections.

Our daily clinical experience teaches us, that although the pillars and soft palate are exposed to infections to a not lesser degree than are the tonsils themselves, and although it is assumed that the latter possess defensive facilities against germs or their toxins; it is nevertheless an established fact, that they offer the first seat of predilection for such acute diseases as diphtheria, simple and Vincent's angina, primary luetc lesions and even for latent tuberculosis, as demonstrated by G. B. Wood.

But that they are guilty of being the portal of entry for the bulk of diseases, whose etiology is obscure, it is very hard to prove, indeed.

Truly, it has been found that in many diseases affecting our system, a certain particular type of germs could always be isolated from the tonsils. Diplococci and streptococci have been cultured from the tonsils in almost every case of articular rheumatism, and when injected intravenously into rabbits have caused a serous exudate in the joints. Furthermore, the germs found in acute follicular tonsillitis, acute articular rheumatism and in the blood cultures of such patients have the same identity.

Apparently, no better proof is required to show the connection between cause and effect. But it must not be forgotten, that we are also able to find on the healthiest tonsils—that never gave a day's trouble—a rich flora of all sorts of pathogenic germs, of various degrees of virulence. It has also been proven, that injections of bacterial cultures obtained from what were considered normal ton-

sils will cause a hyperemia of the synovia and cartilage in almost every joint in the body. Furthermore, all the histological and bacteriological investigations brought down to present day, fail to show the tonsils being penetrated by germs to any appreciable depth, nor are they able to demonstrate how these germs could get into the general circulation by the way of the tonsils.

It is therefore, just as plausible to state, that in systemic infections affecting joints, heart, kidneys and other viscera, with a preceding, concomitant, or subsequent inflammation of the tonsils, we deal with one and the same infection, caused by the same germ or germs. It is a general—somewhat milder—septicemia, where the tonsils are the first, or the simultaneous, or the subsequent manifestation in a series of consecutive local afflictions caused by the same infection.

It must also be borne in mind, that the tonsils cannot act in a different way from the rest of the surrounding lymphoid tissue, either in offense or in defense.

Should we translate this argument into practice, we could not speak of a thorough operation, unless the entire mucosa of the nasopharynx, pharynx and mouth is completely scraped away; a feat not even to be dreamt about.

We may, therefore, say, it has conclusively been proven: (1) that the tonsils are no regional lymph glands; (2) they afford our system no protection against infectious diseases; (3) they possess no mucous glands to help flush out the stagnant, irritant, and injurious material retained in the crypts; (4) nobody has experimentally shown what kind of function the tonsils have; (5) the defense theory is an ingeniously built up structure, but unfortunately mere speculation.

In conclusion, we must state that physiologically speaking, the function of the tonsils should not militate against their removal, whenever such a procedure becomes necessary. There is at present no evidence at hand to prove that such function is existing at all, except as a mere theoretical possibility.

But, whenever the question of focal infection arises, we must admit, that the relation of the tonsils to that particular infection, as cause and effect, is a very difficult problem to determine, requiring all the ingenuity at our command to have it solved.

While clinically. in a suspected case of focal infection, all the odds are against the tonsils; physiologically, they should at least be given the benefit of the doubt, and even granted a temporary suspension of their death sentence, for the purpose of a thorough-going investigation.

1024 Spruce Street.

FOOD IMPACTION IN THE ESOPHAGUS—A SIMPLE TREATMENT.

Dr. James E. Lebensohn, Chicago.

Food impacted in the esophagus produces psychical and physical distress; and constitutes an acute emergency. The removal by esophagoscopy is more difficult than with other foreign bodies. Rather than hazard trauma to the esophageal wall, many endoscopists prefer to push the food mass into the stomach. However, the armamentarium for esophagoscopy is not always readily available: nor the necessary endoscopic skill, for that matter. Fortunately both may be dispensed with in many of these cases; and reliance placed upon a hyperdermic injection of apomorphin, and the *vis naturae* for the expulsion of the mass. The idea, I believe, is original and in my experience the method has been safe, prompt and efficient.

Case Report: At 2 a. m., I was called to see the patient, a young man in a mild degree of intoxication. He had been eating liver, and a bolus slipped down his gullet, and remained impacted. The voice was good, and there was no dyspnea. Nothing unusual could be seen with the laryngeal mirror. A hypodermic injection of apomorphin gr. 1/10 was given. With the first retching movements the offending food mass was expelled: a liver chunk, triangular in form, two inches in diameter and an inch thick. The patient passed the night restfully, and in the morning felt as well as ever.

Many cases of injury to the face, nose and eyes are complicated with acute alcoholic intoxication. I have found it is less trouble in these cases to empty the stomach with apomorphin than with the stomach tube. After the vomiting movements are over, the sedative effect of the morphin element ensues.

25 E. Washington Street.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Nov. 3, 1924.

TUBERCULOSIS OF THE TONSIL.

Dr. James Albert Morgan, Honolulu, T. H.

Primary tuberculosis of the tonsil is so seldom encountered, that the following report will be of interest. The case in question died of the pulmonary involvement, a fact which confirms the general opinion of the lesion always being secondary.

Good authorities believe bovine tuberculosis is the cause of many tonsilar and pharyngeal infections, especially in children, that in this type the disease occurs in the cortex and does not tend to ulcerate. There is not rarely pulmonary or systemic involvement but it may be associated with cervical adenitis. Differentiation between the human and bovine types is best accomplished by innoculation.

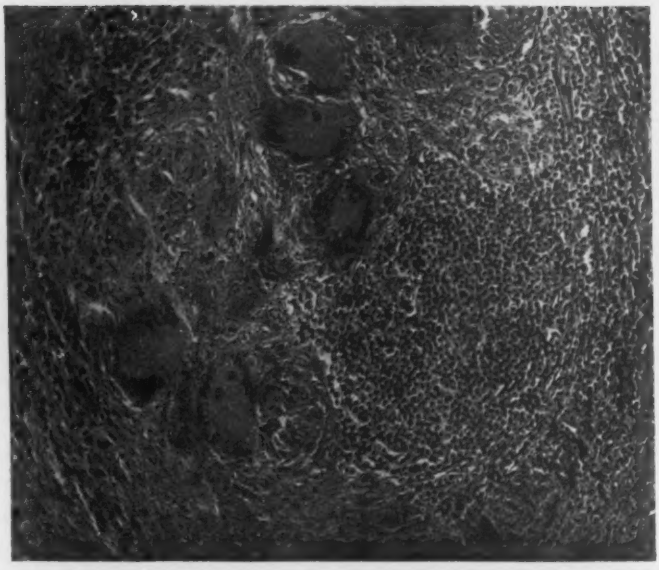
Wood is convinced that the tonsilar tissue of the throat is more liable to infection by tuberculosis than any other part of the upper respiratory tract. The tonsils are affected in nearly all cases of advanced pulmonary tuberculosis and over 5 per cent of all cases of hypertrophy of the pharyngeal tonsil are tuberculous in character.

A distinguishing point in the diagnosis of tuberculous ulcer of the tonsil is that it is exceedingly painful. It runs a slow course, its edges are smooth and the mucous membrane around it is pale gray without induration.

In the series of cases under my observation there was both laryngopharyngeal involvement as well as tonsilar ulceration in all but the one which at first was thought to be either tuberculosis or a malignancy.

M. F., male, Chinese, age 48 years; had for three months suffered moderate leftsided sore throat. During the last week the pain in the throat became so severe that food was swallowed only with the greatest difficulty. The left tonsil showed a deep ulcer involving the lower half and extending deeply into muscle posteriorly to tonsil. The glands in the neck of the same side were moderately hard and painful to pressure. X-ray at this time revealed some old healed lesions in both apices of the lungs. Patient recalled having had a bad cold and cough when a small boy. His father died of some throat affection at the age of 35 years. His mother is still living at the age of 84 years.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 26, 1924.



Smears from the affected tonsil showed no tuberculosis.

Both tonsils were removed under local anesthetic and a prompt recovery was made. The swollen glands soon returned to the normal. The throat was seen frequently during the subsequent three weeks with no further evidence of the previous ulceration.

Three months later the patient returned with one large ulcer involving the entire left tonsilar fossa and an ulcer of the posterior pharynx. At this time an Einhorn tube was introduced for feeding and to relieve the patient from the effort of swallowing. During the first three days the tube caused distress and it was difficult to keep in place. The ulcers healed during this time and the general condition improved. During the fourth week in the hospital there was a general flareup of the tuberculous pulmonary process and the patient succumbed following a profuse pulmonary hemorrhage.

Feeding by lavage was tried in a number of similar cases with excellent results primarily. But all of the patients succumbed within a period of six weeks.

The microscopic examination of the tonsil in this case shows some idea of the topography of the specimen in the low power microphotograph. In this field very little of the true tonsilar tissue remains.

The higher magnification shows one of the few remaining germinal centers of the tonsil and immediately adjacent, a group of tubercles and multinucleated giant cells, with necrotic centers standing out prominently. In some specimens caseation and necrosis is seen but the tubercle bacilli have not been isolated from such infections nor has it been demonstrated in stained tissue specimens.

Room 48, Young Building.

VACUUM TONSILLECTOME.

Dr. Foster A. Beck, Allentown, Pa.

The vacuum tonsillectome was devised, in order, to overcome many of the difficulties and complicated techniques in doing a tonsillectomy. The use of this instrument will enable the surgeon to enucleate tonsils of any size safely and completely, with capsule intact, without injury to pillars or other structures under either local or general anesthesia.

The tonsillectome is made of *steel, nickel plated,* with vacuum cup or pyrex or glass. The instrument is well balanced and designed so as to give maximum strength with minimum weight. The instrument has fourteen parts. Vacuum cup, two clamps for holding cup in place, rubber washer for making cup with ring vacuum proof, canula with ring (two parts), needle, thumb screw for lengthening or shortening needle, catch on handle for holding needle in place, combined lock and ratchet arrangement for locking handles and allowing gradual enucleation when desired, trigger for releasing lock and controlling ratchet, handles (two halves), and removable pin for holding handles intact. The pyrex or glass vacuum cup enables the surgeon to see the tonsil in the cup. The canula is constructed so that when the needle is in place it is vacuum proof, and the distal end is designed so that the opening in the cup can be placed in three positions, right and left side, or up. The lock prevents the surgeon from drawing the snare wire tight, accidently, before the tonsil is in the cup. When the trigger is up, the instrument is locked, when half-way down in neutral position, and when all the way down in ratchet. The instrument can be held in either hand for removal of both tonsils. The vacuum cup prevents infected material from being swallowed or drawn into the lungs.

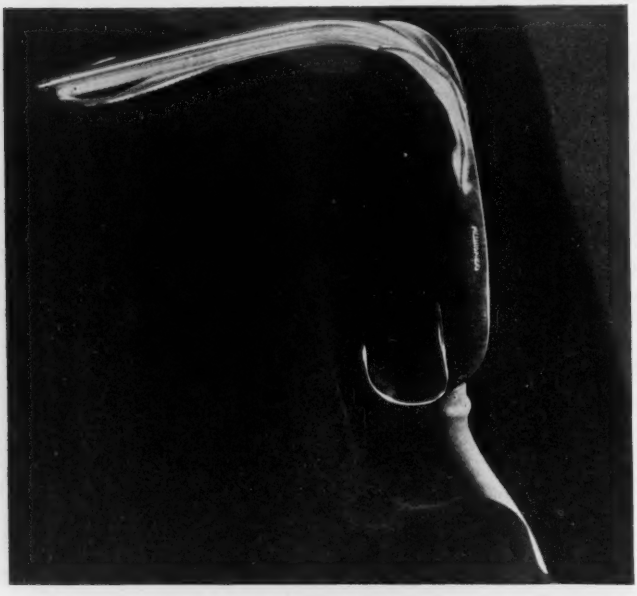
Can use this instrument for dissection operation by removing vacuum cup. With two vacuum tonsillectomes both tonsils can be removed in 15 to 30 seconds.

In order to do the operation quickly two vacuum tonsillectomes should be used. The opening into the cups should be in the desired positions, the needles threaded, with No. 8 snare wire, handles locked, and connected to suction pump apparatus by means of a suitable

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 31, 1924.

length of flexible rubber tubing. A combined three-way stop-cock and release valve (see drawing), should be attached to the tubing about 4 feet from vacuum cup. By using this apparatus both instruments can be attached at the same time, the vacuum changed from one to the other by means of turning valve to either side, and releasing vacuum by turning valve half-way. Have a small aspirating bottle connected to pump so as to collect blood or other secretions that may be drawn into the cup, otherwise the pump may be ruined.

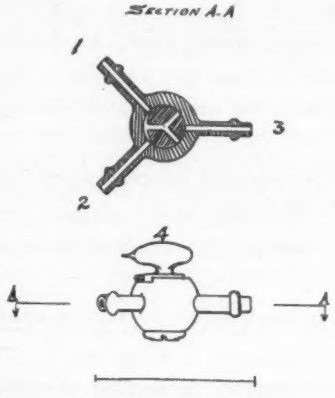
Operative technique (general anesthesia). After the patient is anesthetized, proceed as follows:



1. Start suction pump apparatus and adjust headlight.
2. Lower head of patient, adjust mouth-gag, and turn head to side with face facing surgeon.
3. Use combined suction and tongue depressor to examine throat and clear same of all secretions.
4. With the free hand grasp vacuum tonsillectome, and under direct inspection pass the vacuum cup into the mouth, depress the

tongue with end of canula, turn handles so that the opening into the cup will be on an angle of about 20°, pass lower pole of tonsil to be enucleated into the cup, and then bring cup directly over the tonsil and press lightly against the pillars. If the tonsil is embedded, pass the cup directly over the tonsil and press lightly against the pillars.

5. Have nurse or assistant turn valve from release to vacuum, and tonsil will be drawn out of its bed into the cup; or if preferred to have suction turned on, step on tubing to cut off vacuum; by so doing, the vacuum is formed when desired by releasing foot from tubing. If only part of the tonsil is in the cup it can be disengaged instantly by turning valve half-way.



1 and 2 connect Vacuum Tonsillectome.
3, connect suction pump.
4, connect either 1 or 2 to 3. When 4 is between 1 and 2 vacuum is released.

Release lock by pushing down trigger with index finger of hand holding vacuum tonsillectome, and quickly tighten snare wire on the base of the tonsil and enucleate rapidly or slowly as desired. If the tonsil is to be enucleated slowly the vacuum should be released as soon as the snare wire is tightened on the base of the tonsil. The second tonsil is removed in the same manner as the first.

The combined suction and tongue depressor is used after removal of each tonsil and for removal of adenoids to keep the mouth and throat free from blood and other secretions.

Local anesthesia. Perfect anesthesia is produced by applying the anesthetic topically. The anesthetic used contains butyn 6 grs., and adrenalin 6/200 grs. dissolved in 10 c.c. of distilled water. Five

applications to tonsils, pillars, uvula and pharynx at 5 minute intervals are required. The operative technique is the same as for general anesthesia. The tonsil should be enucleated rapidly. After the tonsils are removed, glyceritum acidi tannici should be applied to the fossae to prevent postoperative hemorrhage.

ADVANTAGES.

1. The use of this instrument will enable the surgeon to enucleate tonsils of any size safely and completely, with pillars intact, without injury to other structures and without using any other instruments.

2. The pyrex or glass vacuum cup enables the surgeon to see the tonsil in the cup. If only part of the tonsil is in the cup it can be disengaged instantly, without injury to the part, by releasing vacuum.

3. The lock prevents the surgeon from drawing the snare wire tight, accidently, before the tonsil is in the cup.

4. The vacuum cup prevents infected material from being swallowed or drawn into the lungs.

5. With two instruments both tonsils can be removed in 15 to 30 seconds.

6. Can use this instrument for dissection operation by removing vacuum cup.

7. The three-way stop-cock is designed so that the vacuum can be released instantly by turning valve half-way.

Note: The instrument is made by Geo. P. Pilling & Son Co., Philadelphia, Pa.

402 Hanover Avenue.

VACUUM FRONTAL HEADACHE.*

Dr. Louis R. Effler, Toledo, Ohio.

The causes of headaches are legion. We recognize headaches of renal, intestinal, or general disease origin; intracranial, gynecologic, and neurologic headaches; ocular, dental, nasal, and several other varieties. The keen diagnostician, who looks for the *cause* in each case of headache, will score the biggest percentage of successes. In a word, headache is a *symptom* that will resist any but symptomatic treatment until the cause is found.

A number of years ago, Sluder called our attention to the existence of what he called "the vacuum frontal headache". He emphasized that this type of headache was usually frontal, low-grade, and made worse on the use of the eyes for close work. He further emphasied that these noses contain no pus and no pathology to the casual (and often careful) examination. His explanation is: that obstruction to the inlet of the frontal sinus causes its contained air to be absorbed and a "vacuum" to be produced. This negative pressure causes a low-grade headache. He explains the asthenopia by saying: the superior oblique muscle attaches to the floor of the frontal sinus, which is its thinnest portion: any use of the eyes for close work causes a pull on the attachment of this muscle with eye strain. This point of attachment of the superior oblique muscle is called "Ewing's point". Tenderness on pressure over this point is diagnostic.

The writer freely confesses that he read Sluder's monograph at least five years ago. At that time, a mental note of the existence of this condition was made and filed away for future reference in the usual pigeon-holes of the brain. The impression made (for no reason of the author's) was that this was a "rara avis" that might some day cross our path and would be recognied when it did. Peculiarly, this delusion might still be persistent if it were not that Fate placed one of these cases in our own household. The awakening came suddenly like an inspiration.

We had been pursuing the notion that a frontal sinus is rarely involved alone. It always seemed to us that the ethmoid is involved primarily and the frontal secondarily. In our own mind, we had

*Read before the Eye, Ear, Nose and Throat Section of the Toledo Academy of Medicine, Jan. 30, 1925.
Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Feb. 4, 1925.

classified the type of headache produced in these nonsuppurative cases as "fronto-ethmoidal headache". We are now convinced that it is identical with Sluder's "vacuum frontal".

This type of *headache* is not to be confused with the *pain* of an acute suppurative frontal sinusitis. In the former, it is a *headache*, bearable, though chronic and severe; in the latter, it is a *pain* almost unbearable until relieved spontaneously or by operation. In the one case, we have the picture of a patient *asking* for relief; in the other, we have the picture of a patient *demanding* relief.

It is not our purpose to swing the pendulum to the extreme of placing every headache, especially every eye-headache, in the "vacuum frontal" class. Our purpose is merely to call the fact of their existence and frequency again to mind; and urge a more searching examination and diagnosis with them in view.

In going over our records for this study, we note that during the past two years we have had exactly 125 cases of Frontal Sinusitis of all kinds. Of this number, there were thirty-five cases of undoubted "Vacuum Frontals". This would seem to indicate that in every three to four cases of Frontal Sinusitis, there is one case of the vacuum type. If this proportion holds constantly, one may readily see that we are confronted with this type of headache rather more than frequently.

How many of these are diagnosed by the average practitioner? Very few, if we are to judge by the amount of "headache-medicine" that has been given; or the numbers of teeth, tonsils, etc., that have been recommended for removal. It is not our purpose here to make game of the general practitioner. He has had long enough to take the brunt for all the sins of omission and commission in medical practice. It is safe to say, however, that very few, if any, vacuum frontal headaches are recognized.

How many of these headaches are diagnosed by our specialists? We are the men who should recognize them if anyone should. We know that this symptom-complex exists and are in a position to distinguish this from other types of headache. The peculiar thing is, we do not. If we are to judge by the number of lenses prescribed for this type of headache, it would seem that the casual pathology is overlooked. In other words, these cases pass through the hands of our specialists as well as our general practitioners too frequently without receiving their just meed of recognition.

It is necessary to diagnose them. If they are not diagnosed correctly, they seldom improve spontaneously. Their tendency is steadily though surely to increase. The usual history is that over a period

of two, five, ten, fifteen, twenty, or more years the patient has suffered from headaches and has succeeded in getting no relief for them from any doctor or any remedy that has ever been tried. The patient has given up hope of ever getting better. He has adopted the very philosophical attitude of suffering in silence or has become completely neurasthenic. Friends have run the gamut from sympathy to callousness. They have heard the cry of "wolf" so often and still see the patient living, that each attack is just another one of "John's or Mary's usual headaches".

Let me quote briefly a few case-reports to illustrate the usual symptomatology:

Case 1: Miss G. B., age 47 years, milliner. This patient has had headaches for the past ten years at least. These were very severe in type and notably more severe on right side. Patient was forced to go to bed for several days at a time. No headache-medicine ever relieved. Engagements had suddenly to be canceled due to the suddenness of onset of these headaches. Often, they would leave as suddenly as they began. The eyes were weak and always under suspicion as the causative factor in these headaches. A well-known oculist was consulted on several occasions over a period of years. Lenses were given and changed, but at no time did the eyes give unimpaired service. Her work became torture and her occupation changed frequently. She became a chronic headache-sufferer.

Peculiarly, this patient also suffered attacks during the past few years of nausea, gastric pain and fullness, etc. (on the average of every six weeks); this was diagnosed as a gall-bladder disease.

On June 4, 1923, a middle turbinectomy and antethmoidectomy were performed. Except for a high septal deviation, right, no pathology was found.

Since her operation, the patient has gained ten pounds in weight. All her symptoms have improved—this not only refers to her headache and eyestrain, but also to her gall-bladder symptoms. She has had two headaches since operation and two gall-bladder attacks; both of these coincident with colds in the head and abortive attempts at a re-establishment of her old ailments.

She says: "Things that were irksome before, I do now without complaint. Altogether, I am a different person."

Case 2: Bishop S., age 35 years. The onset of trouble dates back at least five years. At this time, the first symptoms were those of asthenopia. In spite of a very careful refraction by the head of the ophthalmology department of our largest southern university, lenses

permitted close work for no longer than one-half to one and one-half hours at a time. During the past year this condition became much more aggravated.

Patient found himself unable consistently to perform the duties of his office. Deep concentration produced great reaction. Insomnia and nausea were frequently. Sheer will-power became the driving force. Any collateral reading was out of the question. A neuritis developed in the left arm. The left side of the body, including arm and leg, would become numb, etc. In a word, patient was losing his grip and becoming a confirmed neurasthenic.

This mental condition was improved not at all by a complete overhauling at the Mayo Clinic. No solution was offered beyond a recommendation for the removal of a few doubtful teeth. Subsequently examination by several well-known specialists in Chicago also drew blank. The patient's local physician had seven teeth extracted and recommended a tonsillectomy.

Acting almost entirely upon suspicion, we did a left middle turbinectomy and exenteration of the antethmoids (Sept. 26, 1924). No pathology before operation. At operation, a hyperplastic ethmoiditis was found.

Though the elapsed time since operation is very short, the patient already knows he is well. His headaches, etc., are a thing of the past. His asthenopia has almost entirely disappeared.

A mild recurrence of all symptoms developed with the onset of a coryza recently. But all symptoms faded as the latter responded promptly to treatment.

Case 3: Mrs. Helen C., age 31 years, housewife. Patient has had headaches, especially right side of head, for past five years. These have become much worse during the past year.

At onset of trouble, wore lenses for headache but soon found they gave no relief. Asthenopia was very prominent. Photophobia, lid-fluttering and tearing were so severe that patient invariably sought refuge in bed and in darkness. No medicine ever gave any relief. The headaches would seem invariably to accompany any little excitement as the entertaining of guests or preparing for any little social function a few days distant.

On June 15, 1923, a tonsillectomy was done. Patient gained about ten pounds in quick fashion but experienced no local effect on headaches.

On Aug. 31, 1923, an abscessed tooth was extracted. No appreciable result followed.

Meanwhile patient was becoming more and more discouraged. The headaches were increasing. Her nerves were very much frayed. Her impatience with those around her on most trivial grounds was remarked on many occasions. Her hair, especially on the right side, became prematurely gray.

On May 31, 1924, with no visible intranasal pathology, we performed a right middle turbinectomy and antethmoidectomy. No pathology was encountered.

The result of the operation has had the effect of ameliorating practically every symptom. The effect has not been magical in her case, but improvement has been steady. Recently, a headache accompanied a coryza but disappeared with one treatment.

A further illustration by cases would be fatiguing and pointless. These serve to show the outstanding features of headache with asthenopia, that become increasingly severe, and ultimately wreck the nervous systems by their constant nagging and failure to obtain relief. "Gutta cavat lapidem non vi sed saepe Cadendo."

It is true that headache (or preferably *pain*) and asthenopia accompany the suppurative type of Frontal Sinusitis. But fortunately the very severity of symptoms and the presence of numerous signs to establish a correct diagnosis lead to prompt relief. In the "vacuum frontal" types, there are *symptoms but no corroborative signs* that cannot be explained on pure neurosis grounds. The result is the patient may go many months and even years before the causal pathology is suspected.

Anatomy: The anatomy of the middle meatus is the key to the whole problem. In its simplest terms, the frontal sinus opens into a funnel-shaped infundibulum, which then carves a groove (hiatus semilunaris) that passes downward directly between the uncinate process in front and the ethmoidal bulla behind. The frontal sinus is an air-chamber normally, the atmospheric pressure of fifteen pounds to the square inch outside and inside the sinus is maintained.

Pathology: Anything that tends to disturb this equilibrium in atmospheric pressure is a cause for trouble. In the suppurative types, pressure is built up within the sinus to exceed the fifteen-pound per square inch ratio; hence we have untold pain. In the "vacuum type", pressure within the sinus is reduced to a vacuum by the absorption of its air into the blood: hence we have a bad headache which is made much worse by the use of the eyes.

It is unnecessary to go into the numerous causes or anatomical quirks that spell an interference with proper ventilation of the frontal sinus. The dissections and plates of the old masters, like Killian,

Zuckerhandel, Hajek, etc., etc., are very illuminating. They show numerous abnormalities and anatomical distortions. The inlet of the frontal sinus may be pin-point. The infundibulum may be horizontal or sharply angled instead of vertical. Ethmoid cells developmentally may encroach upon the infundibulum or hiatus semilunaris from above or the side or the front or the back. The bulla itself may be abnormally developed. The uncinate process may be unusually prominent. Deviations of the septum, especially those high up in the middle turbinate region, may cause pressure on the mid-turbinate to flatten it against the structures of the middle meatus. It is necessary for the middle turbinate to hang free in the nose, *i. e.*, it must be away from the lateral nasal wall and not in contact with the septum. It is interesting to note that in these thirty-five cases, no less than twenty-five were found with high septal deviations on the side of the trouble (71 per cent).

Peculiarly, we may get trouble in the side opposite the septal deflection. The compensatorily hypertrophied middle turbinates in these cases serve in the same way as obstructions to the middle meatus. In this series of thirty-five cases, there were ten of this type (28 per cent). It is impossible always to state the factors that disturb this fine sense of balance or patency necessary to equilibrium.

Treatment: From a conception of the anatomical distortions that cause this condition, topical applications of any kind are at best palliative. The logical treatment becomes therefore one of surgical removal of obstructions. Each case will be a law unto itself. At times a correction of a high septal deviation with fracture of the middle turbinate away from the lateral nasal wall will suffice. At times, the mere fracture of the middle turbinate away from the lateral nasal wall will be all that is necssary. At times, a middle turbinotomy or turbinectomy will be necessary. Our usual practice, however, is a middle turbinectomy with an exenteration of the anterior ethmoid cells. This seems more logical because it gives free access to the frontal.

Recurrences: The question of recurrences constitutes to my mind an important chapter of this subject. It is too often neglected. The natural presumption is that once the diagnosis is correctly established and the operative treatment instituted that the case is *cured*. Many of our authors write "Finis" at this point.

This is like the average novel. The first 249 pages are spent in bringing the lovers together, and the 250th ends with their "living happily ever after". But is this the final chapter? We confess a curiosity at times to know whether they stay happily married.

In the same way it is interesting to know whether these frontal sinuses stay *"cured"*. Despite operation they do not always "pursue the even tenor of their way". We must remember that they are "loci minoris resistentiae". Anything that produces a local engorgement in the nose can block off the opening of the frontal sinus, rarify the air in the sinus, and reproduce "vacuum" symptoms. Fortunately, this does not occur often; and if it does, the symptoms are never so severe nor so prolonged as originally. They may call for treatment, however. The patient easily becomes neurasthenic.

In this connection, it may be interesting to note that the taking of alcoholic drinks is a factor in producing postoperative (and anteoperative) frontal headaches. In a number of instances, and more than once in the same case, this phenomenon has been borne in on us. The headache will last just as long as it will take to dissipate the effects of alcohol from the system.

CONCLUSIONS.

1. The "Vacuum Frontal" headache is a definite entity. It is usually frontal, unilateral, low-grade, paroxysmal but tending to become chronic, and made worse by the use of the eyes.

2. It occurs fairly frequently.

3. Treatment is usually directed against the eyes, the teeth, tonsils, etc., with little or no relief. Hence, the need for correct diagnosis and treatment of the causal pathology.

4. The noses in these cases are to all intents and purposes negative and therefore mislead the observer.

5. Recurrences will take place occasionally even after operation, due to alcohol, coryza, etc.; but these usually respond promptly to palliative treatment.

THE END RESULTS OF TONSILLECTOMY.

Dr. H. H. Amsden, Concord, N. H.

This paper will not attempt to discuss the indications for, or technique of, tonsillectomy, except in so far as these factors may influence the end results of the operation. It is of course true that marked post-operative deformity is not incompatible with unimpaired functions of talking and swallowing, yet the end for which all surgeons seek is a throat free from tonsillar tissue, with intact pillars and soft palate. There are two principal factors which determine this result: absence of acute infection in throat at the time of operation; and an operative technique which causes the minimum amount of trauma.

1. Operation in the presence of acute follicular tonsillitis, peritonsillar abscess, etc., is not good surgery. In the presence of acute infection no walling off or limitation of the process can take place. Removal of the tonsils opens up a wide field for absorption. The swelling and tissue engorgement render it difficult to remove the entire tonsil, and necessitate an undue amount of trauma. The inevitable post-operative reaction and infection prolong the period of convalescence, increase the patient's discomfort, and cause an undue amount of contraction and scarring of the throat. There is an increased risk of systemic infection, embolism, pulmonary abscess, etc.

Operation in the presence of acute infection is very apt to be followed in a few hours by a sharp chill, rise in temperature, etc., which generally subside with equal rapidity, but are always followed by wound infection, which in turn influences the end results as already indicated. A possible exception to the above rule may be made in case of Vincent's angina, limited to the tonsil, which does not respond to treatment, yet operation under these circumstances is frequently followed by infection of the wound by the specific organisms.

2. Avoidance of operative traumatism. Today the great majority of tonsillectomies are done by one of two methods: the Sluder, or some of its modifications; and the snare. That most tonsils can be removed more quickly by the Sluder method than in any other way is unquestionable; that it has any other advantages over the snare is at least debatable. The real test of any operation is not its

Editor's Note: This mss received in The Laryngoscope Office and accepted for publication Oct. 23, 1924.

speed, but the end results, so far as clean removal of tonsils, absence of hemorrhage and injury to the throat are concerned, and throat surgeons should check up their results by this standard, rather than by a stop-watch. The fact that so many modifications of the Sluder technique and instrumentation are being promulgated makes one who has never departed from the old-fashioned snare question whether the last word has been spoken in tonsil surgery, and whether the advocates of the guillotine are entirely satisfied with their results.

One of the annoying accidents which frequently occurs during tonsillectomy is the stripping of the mucous membrane from anterior pillars or uvula, or the more or less complete amputation of the posterior pillar. These accidents can be avoided only by carefully severing the mucous membrane connecting the tonsils to the adjacent structures, which should be done by sharp knife or scissors, and need occasion no injury to uvula or pillars. After the loop of the snare has been applied to the separated tonsil, at least one minute should be devoted to tightening the snare, as this allows time for clotting in the divided vessels. When the separation is completed, without removing the tonsils from the fossae, they should be held in place for one or two minutes. This is a most valuable hemostatic measure, and reduces bleeding and traumatism of the throat to a minimum and in at least 75 per cent of all cases no other hemostatic measures are necessary. The writer is convinced that the adoption of this procedure will do more than anything else to lessen postoperative swelling and infection of the tonsillar fossae. If bleeding points appear after the removal of the tonsils, it is best to catch them with curved artery forceps. Repeated sponging or applications of the suction tube directly to the tonsillar fossa increase bleeding rather than lessen it, and are seldom necessary. A bleeding vessel which requires ligation can best be controlled by passing a curved needle around the vessel, carrying an absorbable suture. This is not a difficult procedure in the great majority of cases.

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SOME PHASES OF THE TONSIL QUESTION.

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There is probably no subject, especially among nose and throat men, so hackneyed as the tonsil question. Much has been written and usually when it is all summed up the same ground had been covered in practically the same way by all writers. It is our purpose in this paper not to cover the whole field of the tonsil question, but to enter into a brief discussion of some phases which appear to us to be lightly touched upon and which have seemed of considerable importance.

Diagnosis: First, in regard to the diagnosis of infected tonsils. The following answers to a questionnaire on this point show the wide difference of opinion and emphasis placed on various symptoms:

1. How do you determine whether or not tonsils are infected? Inspection 8; history 8; judgment 1; culture 6; pus in crypts 19; congested pillars 7; pain 2; hypertrophy 2; cervical gland hypertrophy 9; lymphocytosis over 40 per cent 1.

So the question arises—when is a tonsil infected sufficiently for removal? First, it is our custom to consider the history of the case. Has the patient had frequent attacks of tonsillitis or quinsy? If he has, even though the attacks be remote, we believe we should consider the tonsils diseased until they can be proven otherwise.

Second, in regard to the cervical glands, if the glands are enlarged and have been so for a considerable period and there is no other evident focal infection in the region of the head, we infer that the tonsils are diseased, especially if there has been a previous history of tonsillitis. Of course, at this point we must differentiate causes and must not be in a hurry to connect large cervical glands with supposedly diseased tonsils simply because the glands in the neck are enlarged. We must always think of syphilis, tuberculosis, infected teeth and bear in mind Hodgkin's disease as well as other rare diseases of this region, such as carcinoma or sarcoma, but if these diseases can be excluded, then the evidence would point toward the tonsil as the cause of the enlarged gland, especially if we have concomitant anemia and high white count unexplainable by other causes.

Third, direct examination. Size alone is not ordinarily sufficient evidence for removal; however, a large tonsil usually contains infec-

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 18, 1924.

tion and every effort should be made to find that infection. It is our custom to consider one or two points in the local examination of a tonsil; first, the tonsil itself. Is it full of crypts? Does it look boggy? Can cheesy material be extruded on pressure or can fluid pus be expressed? Cheesy material without odor is doubtful evidence of infection. Fluid pus with odor is a positive evidence of infection, and it is in these cases that enlarged cervical glands are found, especially in children with anemia and malnutrition, or in an adult, rheumatism, endocarditis and other diseases which commonly follow a real focus of infection.

Fourth, congestion of pillars. We believe that a tonsil that is not infected will show pillars that are not more congested than other regions in the throat, but red, angry pillars are usually evidence of deep tonsil infection and we have found that firm pressure on the anterior pillars will usually bring a considerable quantity of purulent material to the surface.

Fifth, history of diseases caused by focal infection. If on a thorough examination we find no pus can be expressed from the tonsil the pillars not even congested, the tonsils small in size, and the history negative as to previous tonsillitis, with systemic infection commonly supposed to follow tonsil infection, we would advise the tonsils to be removed, as for instance, in cases of gastric ulcer, pyelitis, cholecystitis, and other lesions definitely known to be caused by focal infection. If other causes can be reasonably excluded, even though the tonsils appear negative, we advise removal, and it is only too often, in such cases, that our pathologist reports streptococcus, either viridans or hemolyticus.

Prognosis: The question often comes up when we see a tonsil that does not look quite normal, yet no definite evidence can be found to warrant a positive statement that the tonsil is infected, as to whether that tonsil should be removed and if so, what the result will be. A patient may have evidence of focal infection, such as rheumatism or endocarditis, and we in our own mind feel quite sure that the tonsil is the source of that infection, even though we cannot demonstrate this fact to the patient, and even though no other evidence can be found to account for the trouble. We would like to tell such a patient that if the tonsil is removed he will be relieved of his symptoms, as he ought to be if the tonsil is the direct cause and sole source of his trouble and the condition has not gone on so long that secondary changes have taken place. However, we have never yet been able to feel certain enough to speak positively on this point and it would seem that a real piece of original work could be done

along this line. Patients are interested in knowing about the end result and their inquiry frequently is: "Do I have to have this piece of surgery done and if I do have it done will I be improved with respect to certain definite symptoms?

As to the first query do they have to have it done in order to get improvement, or ward off impending systemic infection? It is very strange, but many times we see people with grossly infected tonsils or a disgusting pyorrhea living to a ripe old age and suffering nothing from these diseases. At other times we will find patients with a very slight infection, such as an apical abscess on a tooth root and the direst consequences follow. Just why this should be, we do not know and it is for this reason that we do not feel very certain in advising a patient that a definite infection must be removed if he expects to be cured of a systemic condition and if he would prevent the end results which his friend may have had from a similar focus. If we were able, then, by locating a focus of infection, and knowing what that infection will do in some patients, to state positively what it will do in all patients, we would have a much clearer conscience about advising surgery of the tonsil, than we do now.

In order to work out this problem satisfactorily, much work will yet have to be carried on along the lines of a study of resistance and selective foci for it would seem to us that causing the existing pathology, are many unknown factors, doubtless, of which no note is taken, and these factors will have to be discerned if we are to get to the bottom of this problem. The question of resistance versus the pathology is evident in other lines besides infected tonsils as, for instance, in visceroptosis, or Glenard's type of individual. There are many women with the colon down to the brim of the pelvis with no symptoms whatsoever resulting from this ptosis, others with nephoptosis and no symptoms, others with a lacerated cervix and a relaxed perineum and no symptoms, while others who are more neurotic or with less resistance will complain of many symptoms from ptosis of the gastro intestinal tract, a prolapsed kidney, or a torn perineum, and we cannot set this aside by saying that it is simply a neurosis due to highly developed city life. We feel that there must be some definite factors in the makeup of every individual which it will ultimately be possible to measure accurately, which when added together, will be known as his resistance, and in advising surgery and offering a prognosis in regard to this surgery, or the necessity for same, we will in every case go thoroughly into all these factors, some of which we have mentioned. At the present time we have no other alternative except to say if a tonsil is infected it should be removed

for it may cause trouble (we cannot say for sure that it will). Another factor of equal importance will be a selective study of the various foci in order to determine which ones are active and what their various relations may be to the symptoms in question.

For some time I have felt that more detailed study and investigation should be made of the tonsil question in its relation to systemic infection. The fact that the general principle of focal infection is well established, that in certain instances the tonsils have been the particular foci causing systemic infection, such as rheumatic and arthritic conditions, proved by the fact that the systemic disease was entirely relieved following complete tonsillectomy, has perhaps led us rather hastily to conclude that all tonsils showing cryptic debris or other evidence of infection should be removed, and if properly removed would clear up the rheumatic or arthritic condition. One does not have to be in practice long to learn that this is not always so, even when the most painstaking and thorough examination has been made by a competent internist, and a perfect tonsillectomy done. The longer one has to deal with these questions, if he is conscientious and follows up his cases, the more he will wonder if there may not be some factors of prime importance which are still unsettled or perhaps not even seriously considered.

A recent article along this line in the *Journal* of the American Medical Association by Alvarez, is very illuminating. He shows that the results obtained by removal of tonsils in adults for certain chronic systemic conditions are, to say the least, very disappointing. It may be that a good many of the patients mentioned in his report, since they came to him from scattered sources, had had tonsillectomies done elsewhere on hurried or immature advice. Yet there remains the fact that tonsillectomy was done in certain instances on the grounds that the tonsils showed infection, and for the purpose of remedying a systemic condition with no improvement. It is also possible that certain of those in the rheumatic or arthritic group who were benefitted by tonsillectomy had some other treatment, such as extraction of infected teeth, physiotherapy or climatic advantages which may have been the beneficial factors, rather than the tonsillectomy. Also it may be, and doubtless is true, that in certain instances where the tonsil may have been the original focus, the case may have been of such long standing or become so general in its spread that new foci developing from the original tonsil are now the direct cause of the symptoms rather than the original focus. Or that had these same patients who reported improvement by tonsillectomy taken the Abrams or Christian Science treatment, they

might have reported as favorably. Statistics, especially medical, are hard to interpret, but even in a series so small as Dr. Alvarez has given, call for serious consideration.

There are doubtless many good reasons for doing tonsillectomies, but just what will happen to the system as a whole after this operation is done, or what would happen if it were not done, is what we must know more about if we are to give an intelligent prognosis in this class of cases.

Just as individuals vary in size, appearance, and so forth, it is reasonable to suppose that they vary in the matter of resistance to infection. One patient has an acute appendix and dies. Another has practically the same condition, and makes a good recovery. So, through the whole list of diseases, one patient reacts favorably and another does not. Why is this? Allowing for difference in virulence of bacteria, age and size of patient, we still have the major factor of resistance to infection or immunity which is of much importance when giving a prognosis, and especially in the matter of focal infection. If we understood and had some way of measuring from time to time the resistance of an individual to a particular focus of infection, we could then make a graph showing whether he was approaching the danger-line or receding from it, and determine whether a tonsil, even though it contains cryptic material, must be removed to prevent the patient crossing the danger-line and developing serious conditions. On that same basis, if the tonsillectomy was done and we had removed the correct focus, the infection curve should subside. Whether this resistance should be measured in terms of blood chemistry (blood urea or sugar tolerance), by lymphocyte counts, or in some other way, we do not know, but it seems of sufficient importance to warrant the most exhaustive studies and experimentation.

A questionnaire recently sent out to a number of laryngologists and internists on this subject brought the following results: Question: Is the resistance of the patient an important factor in estimating the progress of a focus in the tonsils? Answer: Yes, 25; no, 3. Question: Do you know any method of measuring individual resistance? Answer: No, 24; by ancestry, 1; by habitus, diet, hygiene, exposure, infection, habits, etc., 1; clinical judgment, 1.

The fact that twenty-five out of twenty-eight were very emphatic in their belief that resistance is an important factor, and that twenty-four of the same men had no way of measuring that resistance, is most interesting.

If future studies along this line result in some accurate methods of infection curve and resistance estimation, we may, at least, be

spared the criticism of ill-advised tonsillectomies. Also, we may be able to persuade many patients, certainly headed toward systemic infection in later life, to permit thorough search and adequate attention to foci while there is yet time.

Treatment: Generally speaking, we do not believe that medical treatment of a chronic diseased tonsil is of any use whatsoever. So-called circumcision of the tonsil is of even less value. Radical enucleation by complete tonsillectomy is the accepted treatment today, but the methods used vary considerably.

Anesthesia (general): First, in regard to anesthesia and position, we believe ether should always be given to children and favor using ethyl chlorid or gas oxygen in the first stage to induce rapid unconsciousness. From an experience of over four thousand tonsillectomies we believe that the Rose position is the one best adapted for operation with a general anesthetic. The value of the Rose position to one who is accustomed to it cannot be overestimated. With the head lower than the body the blood, pieces of adenoids, vomitus, or any foreign material is removed by gravity and we do not have to depend upon any suction apparatus to keep the throat clear. It is a very easy matter, when the patient lies flat on the table, for some foreign material to be carried into the lungs by insufflation and form an abscess, no matter how careful the operator or his assistants may be, and we firmly believe that a position favored by gravity is the safest and the best preventive of this difficulty, as well as the easiest in the matter of keeping the operative field clear.

Local. In using a local anesthetic it does not make much difference whether one uses .1 per cent cocain, as is done at the Mayo Clinic, aposthesin, or novocain, if one uses ordinary judgment. The main point we wish to mention in regard to the local anesthetic is that some operators paint the throat with a strong cocain solution previous to the injection. This practice we dislike very much because while a sensitive throat oftentimes is a great hindrance to doing tonsillectomy rapidly, a complete loss of sensation in the pharynx is a great detriment to the patient and it is these patients, we believe, where sensation in the pharynx has been removed by cocain, that have suffered the occasional misfortune of having a lung abscess, due to the fact that materials have gone down the trachea unrecognized by the patient.

Another point which we wish to mention is in regard to secondary tonsil tissue, located at the base of the faucial tonsil. Many operators do not bother with this, partly, as they argue, because a considerable hemorrhage results in its removal, and partly because it is

not a source of infection. We are very positive from our experience that this tonsil is capable of holding infected material and is as real a source of infection for its size as the larger tonsils, and so it is our practice to remove this tonsil tissue completely to the base of the tongue.

So, we are lead to the following conclusions:

1. In the matter of diagnosis, the important points are: a, the history of the case; b, the character of the cervical glands; c, the evidence found by direct examination; d, the condition of the pillars; e, a history of diseases caused by focal infection.

2. In regard to prognosis. With our present knowledge we have no alternative other than advising removal if infection is found, simply hoping that the symptoms of a focal infection will be improved. We have no way of being certain that focal infection diseases, supposed to be caused by infected tonsils, will be prevented or that definite diseases of this character which the patient now has will be cured, other than the fact that general statistics support the point. Whether a particular individual will be benefitted we cannot say and until studies have been made determining selective foci and individual resistance, and this resistance balanced against his known infection, we will not be able to speak authoritatively to him on this point.

3. In regard to treatment. We believe the anesthestist a major factor in tonsil operations. We think the Rose position, favoring gravity, to be the proper position for a general anesthetic in tonsil operations, since it is almost impossible while in this position, for the patient to insufflate blood clots, adenoid material, stomach contents or what not. Also, in doing a tonsillectomy in an adult under a local anesthetic, we advise against painting the throat previously with a cocain solution, since we believe if sensation is lost in the pharynx it is much easier for materials to drop unnoticed into the trachea and thereby be a factor in the production of a lung abscess.

Johnston-Wickett Clinic.

ENDOSCOPY OF THE ESOPHAGUS FOR DIAGNOSIS AND TREATMENT OF STRICTURE, CARDIOSPASM AND MALIGNANT DISEASE.*

DR. HENRY HALL FORBES, New York.

The Chairman assigned me to the diagnosis and treatment of stricture, cardiospasm and malignant disease of the esophagus by endoscopy and very kindly requested that I limit my paper to ten minutes; this I am willing to do and I will try to speak only of the most interesting phases of these conditions as they appeal to me.

Esophagoscopy was one of the later developments of our means of investigating the interior of the body by hollow tubes combined with electrical illumination. Only a few years ago when I requested the Medical Department of the hospital to refer esophageal cases to the Bronchoscopy Department for examination, I was met with the reply that the operation was too dangerous. My impression is that I was faced with a 23 or 24 per cent mortality. This will serve to illustrate our progress in the use of these instruments and I am quite sure the writers of the evening's papers have now no apprehension in performing an esophagoscopy for diagnosis or treatment.

In the diagnosis of these esophageal conditions we find dysphagia the one common symptom, the patients presenting themselves with either an acute complete blocking of the esophagus, as seen in a case of angioneurotic edema or the slow gradual onset of this symptom as it occurs when the esophagus is attacked by malignant disease. The endoscopist at this point becomes the specialist for the diagnosis and relief of the dysphagia, for it is to him that the internist and surgeon now turn for assistance.

As a general proposition in all cases of difficulty in swallowing, a study of the act of deglutition should be made by the fluoroscope. This consists of an attempt by the patient to swallow a barium or other opaque mixture. At the same time a radiograph of the chest is taken to determine any evidence of external pressure which might cause a pressure stenosis. A most interesting picture is seen by the fluoroscopist in a marked case of stricture of the esophagus, which has existed for some time, a sausage-like dilitation will be found filled with the barium mixture and below this point a thin line will

*Read in part at a meeting of the Section of Laryngology, New York Academy of Medicine, Oct., 1924.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Jan. 30, 1925.

be noted as the barium mixture slowly passes through the strictured area; this is known technically as a canulization.

A complete physical examination of the patient and a blood test are routine preliminaries. An indirect examination of the pharynx and larynx is made to eliminate any disease in this location. Jackson's sign of high esophageal stenosis is of value and consists in the pyriform sinus being found filled with a frothy secretion. It is in these cases of high obstruction that secretions may enter the larynx. This has occurred in an examination by the bismuth mixture, the radiograph later showing the mixture in the bronchi.

Congenital strictures, webs and imperforate esophagus in the new born occur and the bronchoscopist is an aid in both diagnosis and treatment. Gastrostomy is indicated in the cases of imperforate esophagus, while in congenital stenosis careful bouginage is successful and the risk is slight if any, as regards to mortality.

Stricture or compression stenosis of the esophagus by pressure from without occurs. Aneurysm, dilated heart and thoracic new growths have occurred the most frequently in my experience. The presence of an aneurysm is a distinct counterindication to esophagoscopy except in case of foreign body.

The diagnosis of the stricture following the accidental swallowing of one of the caustic soda washing powders is easily made. We have the history of the accident, the presence of burns of the mouth and pharynx and a difficulty or total inability to swallow even liquids. This type of case has been of interest to the bronchoscopist and at the present "The Lye Committee of the A.M. A." is making efforts to pass legislation in all states preventing the sale of these preparations unless sold under the "poison" label and the antidote printed. I have found the most frequent site of a cicatricial stenosis in these cases to be in the region of crossing of the left bronchus. The dilating of these strictures under the guidance of the eye is most satisfactory by the use of bougies. Do not be in a hurry; rapid divulsion is not necessary and the risk is too great.

The symptoms in cases of slowly developing stenosis are practically the same, dysphagia may be noted as the first to occur, later as the stricture contracts and food is retained for some time we have a regurgitation of the ingested food mixed with secretions. Loss of weight is marked in cases of nearly complete stenosis. This loss of weight you can readily see will be determined by the amount of food which can pass the stricture. Occasionally patients will present themselves with an acute obstruction, and a history of a gradu-

ally developing difficulty in swallowing—this may be due to the lodgement of some solid particle of food which gives us the symptoms of an acute stricture; for example, the recent case of a child in which the acute symptoms were relieved when the child vomited a large huckleberry, but in which later a stricture was found due to the swallowing of a lye preparation some months before. With the above history and after the fluoroscopic examination, the esophagoscope may be passed—this I consider to be a hospital operation. In making a differential diagnosis with the esophagoscope our previous experience will be of value and it is well to keep in mind certain points. The spasmodic contraction of the cricopharyngeal muscle must not be mistaken for a stricture; this may puzzle the beginner and the use of a general anesthetic may be necessary to clear up the diagnosis between a cicatricial and spasmodic stenosis. The narrowing due to a pathological lesion is recognized by the eye, but it may be necessary to use suction or even lavage to wash away food remnants before the actual local conditions can be recognized. The cicatricial area, which may be annular or eccentric, is seen usually pale as compared to the normal mucous membrane. Stagnation of food may cause dilitation, esophageal inflammation and even ulceration.

The treatment of the acute cases must be one of caution. Blind bouginage is of course to be avoided as it is not only a dangerous procedure but violates all the principles which the bronchoscopist is trying to teach. The expectant plan is best; we allow the healing of the ulcerated area in the acute cases, the use of specially prepared foods is in order, and bismuth subnitrate as a dry powder is given, this has a local antiseptic action on the mucous membrane. Later a gradual dilitation of the strictures under the guidance of the esophagoscope is in order. If the obstruction is so marked that no fluids will pass, a gastrostomy is in order; this is an additional aid in our treatment as it puts the esophagus in a physiological rest, supplies water and food and hastens the healing of the ulcers. Care in diet, careful watching of weight loss and the assistance of the pediatrist will be a help in our feeding problems in children; a gastrostomy may thus be avoided. These principles of treatment are to be followed in all cicatricial stenoses. The technique may have to be varied to suit special cases or indications.

Dr. Jackson advises me that he feels retrogate bouginage, with the Tucker bougie, is the most rapid way of accomplishing results in all cases not suitable for esophagoscopic bouginage; that is, in all cases where the strictures are multiple and eccentric.

Electrically heated bougies have been used by Dr. Imperatori and others with good results. Impermeable strictures in the cervical region can be relieved by external operation.

Accidents are bound to occur and a rupture of the thoracic esophagus is an unfortunate experience in our attempts to dilate a stricture or when diagnosing and treating malignant disease. This is not necessarily a fatal accident. I have reported one case of rupture of the esophagus occurring in a child; the patient recovered without operation. Immediate gastrostomy may be performed in a case of ruptured esophagus and thoractomy, should the pleural cavity be involved. Rupture of the cervical esophagus is not so serious in its complications.

Cardiospasm is the term still used in the textbooks for the condition which endoscopists, through the studies of Jackson and Mosher, believe to be due to the closure of the esophagus at the level of the diaphragm by a spasmodic contraction of the muscles which surround the esophagus as it passes through the diaphragm. It is termed by one author, a diaphragmatic pinchcock stenosis, a phrenospasm. The effect of the spasm is to cause either a partial or complete obstruction to the passage of food into the stomach and to give rise to the following symptoms which help us in our diagnosis. The most constant symptom here as in the organic stricture is dysphagea, varying in degree. If the spasm is frequent in its periods of complete closure, there is distress, and a feeling of distention as the food accumulates above the diaphragm. This may be relieved by a regurgitation of the accumulated food. It may be noted in cardiospasm that fluids give just as much trouble as solids, differing from the malignant or benign stricture. The patient feels the relaxing of the spasm and will tell you the food is now passing into the stomach. Loss of weight due to the nutritional disturbances will be found early in the severe cases. Hiccough may occur as a symptom, and dyspnea after eating, due to pressure of the dilated esophagus may be present.

The diagnosis of cardiospasm is made by the long duration of the conditions, the difficulty in swallowing both liquid and solid food, the X-ray findings, *i. e.*, the obstruction to the barium mixture occurring at the level of the diaphragm and finally the results of the examination by the esophagoscope; large instrument will pass into the stomach. The presence of an ulceration, a new growth or an organic stricture is easily recognized.

The treatment of these cases is most satisfactory, in many cases, the passage of an esophagoscope will cure our patient. A certain number may require forcible dilitation; others may be relieved by the

use of antispasmodic drugs. Forcible dilitation has been followed by fatal results. If necessary a stomach or duodenal tube may be used as a means of keeping up the nutrition. Gastrostomy is rarely required.

The diagnosis in the average case of carcinoma of the esophagus is not difficult. Unfortunately many do not come for treatment until a cachexia plus a history of gradually increasing difficulty in swallowing and loss of weight are present. Pain is a later symptom. Here again a full history with a complete physical examination as well as blood tests should be made. This is followed by a fluoroscopic examination of the esophagus, using the barium salts as well as an X-ray plate. With this data before us an examination of the esophagus is made in the operating room, usually under local anesthesia, using my esophageal speculum for the upper portion of the tube and the 7 m.m. or 10 m.m. esophagoscope to continue the examination downward. The lesions found vary; early there is a simple infiltration, later ulceration is present. The cancerous ulcer has raised edges and granulative tissue—this bleeds freely on any manipulation. Simple, luetic and tubercular ulceration must be kept in mind. A combination of a luetic and malignant lesion may be present. Biopsy renders the diagnosis certain and a specimen when the lesion presents fungations or polypoid masses, and may be taken, especially if radium is used at the same sitting.

Treatment: Early gastrostomy to give the esophagus physiological rest and to keep up the nutrition is to my mind the first indication for treatment when a diagnosis has been made. Hunger and thirst are relieved and life prolonged; no patient should be permitted to starve to death.

Radium or combined radium and deep Roentgen therapy, I believe to be still in the experimental stage. The earlier we see our cases the better will be the results of our treatment. My earlier study embodied in a paper in 1920 led me to feel very pessimistic in the use of radium. However, recent results and the reports of other observers should encourage us in our efforts to help these otherwise hopeless cases.

Transthoracic operative efforts are still advocated by the surgeon in early cases and when the nutrition has not suffered to a great extent.

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NASAL INFECTIONS.

Dr. F. W. Briggs, Duluth, Minn.

Any study of infective processes within the body implies a knowledge of the lymphatics and their mode of activity. The lymphatics have to do with prevention of infection, yet when infection has once become established the lymphatics act as disseminators of germs and their toxins. The lymphatic system derives its name from the fluid it contains: lymph, meaning water. The constituents of lymph are about those of the blood. Each being less in amount except water, which is much more. The blood capillaries absorb materials soluble in water, while the lymphatics are capable of absorbing solids and materials insoluble in water. The lymphatics include not only the lymph vessels and the glands through which they pass, but also the lacteals or the chyliferous vessels of the small intestines, which differ in no respect from the lymphatics elsewhere, except they contain a milk white fluid, the chyle, during the process of digestion. The material thus absorbed from the upper parts and organs of the body, after passing through the lymph glands, is collected into the lymphatic vessels, to terminate in the subclavian vein just before it enters the heart. The lymph nodes or glands are small oval-shaped bodies, situated in the course of the lacteal and lymphatic vessels, so that the contents pass through them on its way to the blood. The lymph node has a hilum where the blood vessels leave and enter, is composed of a medullary and cortical portion and is encapsulated. The efferent vessels are derived from the medullary portions, while the afferent vessels empty themselves into the cortical substances. In general outline, they strikingly resemble the kidney. Included with these structures are also the appendix, Peyer's patches, solitary lymph nodes, tonsils and adenoids which are situated subepithelially, but have function identical with the lymph glands, more nearly along the blood vessels. The function of the lymphatics, aside from being the conveyors of the products of digestion into the blood, is protection from the invasion of pathologic and disease producing organisms. The exact manner by which this is accomplished can best be studied and its importance realized by a study of the lymphatics when once they become deranged, for thus they become the conveyors or disseminators of infection. The lymphatics of the upper extremity, including those of the nasal fossa,

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 7, 1924.

were first studied and described in 1859 by E. Simons, while the lymphatics of the nasal sinuses have been further investigated by Sir Frederick Treves, Delmere, Poirer and DeCosta. From these studies we may conclude that the lymphatics of the nasal sinuses drain into the pharyngeal lymph nodes, which receive their tributaries from the nasal fossa. They in turn send vessels to the internal jugular group of cervical nodes, which communicate freely with each other and with the external group, to terminate in the jugular trunk, which on the right side helps to form the lymphatic duct, or enter directly into the internal and subclavian veins, and on the left side empties directly into the venous junction of the thoracic duct.

The upper or olfactory portion of the nasal fossae which communicates with the meninges, has a system of lymphatics more or less independent of the lower respiratory portion, but both systems run backward to the posterior wall of the nasal fossae where there is a veritable rendezvous of the lymphatics. Here they communicate with some coming from the Eustachian tube, and empty into the retropharyngeal nodes, which drain into the internal jugular chain underneath the posterior belly of the diagastic muscle. The nose is well supplied with lymphatics. In general their development is scant and slender, where the mucosa is thin and stretched, as in the septum, superior turbinate, and ethmoid regions. But where the mucosa reaches its maximum thickness, as in the floor of the nose and in the turbinates, the richness is indeed marked. In conclusion it is safe to assume that the lymphatics of the nasal fossa together with those of the nasopharynx are made up of a single net, whose parts are more or less directly connected with each other, and become an integral part of the lymphatics of the body.

In order that focalization of pathologic germs may occur within the body, there must be, at least, a temporary breakdown in the lymphatics, at the point of this focalization, else a nidus of infection could not be. It is important that this fact be borne in mind, in any study of the incidence of infection, whether it occur in an abrasion, of the outer covering, of the body, along the alimentary canal or in the upper respiratory tract.

The nose is an air handling organ, a part of the respiratory system, wherein the air is moistened, warmed, and cleansed, the mucus membranes of which are capable of killing or rendering harmless any and all pathologic germs, provided they come in contact with it, in not too great numbers at a time.

Nasal infections occurring in the infant, usually have their origin in the chronic rhinitis of the nurse or mother, either by direct con-

tact, as in kissing, or through the act of sneezing or coughing. The ease with which these noses become infected is due to rudimentary and undeveloped nasal anatomy, lodged there by the act of vomittrils of mucus or coagulated milk, lodged there by the act of vomiting, making normal nasal respiration impossible. Once infection has obtained, there is produced a vicious circle, the more often or virulent the infection, the less the nose is used, the greater the congestion, the less the development. Thus within the nasal fossa, we have at least a temporary breakdown in the lymphatic tissues.

With often repeated or continuous infection within these organs the glands along the lymph streams leading from these infected areas must of necessity break down as is so commonly seen in Waldeyer's ring. When these glands no longer function they become an added load and contribute enormous quantities of pus and debris to the already infected lymph stream on its way to the heart. Once these products reaches the heart the germ fighting elements and organs of the blood and respiratory system are called upon, over long periods of time, to deal with enormous quantities of germs, which function may not be accomplished, leaving the germs to float about in the blood, there to metastesise wherever is found tissue of low vitality. Thus the appendix, gall bladder, pancreas, heart and lungs may succumb and become the seat of metastatic infection, which because of its pain or other serious manifestation calls for immediate attention, and for the time being, overshadows the condition in the upper respiratory tract as of etiologic importance. For by the time metasteses have arisen the nasal condition has drifted into chronicity, giving the patient little distress or discomfort. However, occasional exacerbations that are called colds, indicate infection; yet because of the slight discomfort they occasion (as a rule) their significance is little appreciated and pass unnoticed. Nasal discharge, however slight, is pathologic with very few exceptions, and indicates lymphatic breakdown or a nides of infection. The nose as an air handling organ must come into intimate and close contact with the air in order to warm, moisten, and cleanse it. How then can the nose function, if it is blocked or bathed with mucus, or is not used as in mouth breathing? Nasal discharge is not normal, as is seen by the discomfort it occasions. Some is forcibly blown from the nose or is drawn back into the pharynx in order to re-establish nasal respiration. Some seeps into one or more of the paranasal sinuses, but by far the largest amount is absorbed by the lymphatics. The fibrous tissue resulting from inflammatory processes within the lymphatics offers no resistance to pathologic germs

and their toxins, consequently tonsils early cease to become sore following acute infections within the nose, but are small and shrunken, giving little, if any, discomfort. If tonsils are removed before this process of shrinking takes place there is produced artificially a condition analogous to that which would ensue were they left to nature's processes, but in a shorter time. In either event, nasal infections have neither been cured or prevented. Indiscretions in dress or exposures to drafts are but the occasion of the lighting up of infections within the nose, and not their cause. The common cold or nasal infection, depends upon germ life for its inception, and in this respect does not differ from any infective process. Because of the rudimentary and undeveloped condition of the nose, mucus surfaces are incontact, at which points germs lodge. These areas of contact may be large or small, constant or occasional, but are the primary focus of infections and supersede all others.

Until this condition is recognized and rectified we can rightly expect metasteses to appear and reappear wherever blood circulates. Nasal infections date usually from infancy. Full many is the child who during a third or more of his development years does not use his nose either because of nasal obstruction, infective processes, habit, or a combination of these reasons. Yet air properly prepared for the lungs can be accomplished only by passing through a normal nose, and a normal nose cannot be developed unless it is used eighteen times a minute, sixty minutes an hour, and twenty-four hours each day. Any gross departure from this physiologic process invites infection with a commensurate lack of development, and the establishment of that so-called vicious circle. The less the nose is used the less its function and the less its development. Animals that spend their lives in the open air do not have nasal infections and are subject to very few diseases. Those who have studied these animals are astonished at the wonderful development attained in all the organs and tissues, and the almost entire lack of infective processes. Tumors are not encountered and cancer is unknown. The employment of the X-ray and transillumination is of little value in determining mal or dis function of the nose and is unable to demonstrate the points at which mucus surfaces impinge within the nostrils. True they sometimes tell us of metasteses within the sinuses, but these are late processes and their treatment or surgery, though sometimes necessary, have no permanent effect upon the primary cause of these metasteses.

Nasal drainage is not the object to be sought in our teachings or our surgery. It is nasal ventilation and areation. A functioning

nose does not drain, nor a draining nose function. The removal of turbinates cannot but destroy function, and the ablation of paranasal sinuses is entirely uncalled for in nasal surgery, in but strikingly few cases. The surgeon's first duty lies in the restoration of function, and the conservation of nasal tissues. In noses with impaired function, it is always possible to demonstrate with the pharyngoscope one or more points where mucus surfaces are in contact. Herein lies the greatest factor of the inception of infective processes within the body.

With the passage of time, insidiously, silently passing out to the heart from these areas, is a more or less constant stream of pathologic organisms, and the toxins that they have elaborated. Our attention in later life is often called to infection throughout the body, which seems to be entirely independent of this primary focus. Yet it is a well known fact that infections tend to become silent and painless, hence the difficulty of tracing cause to effect.

For years we have accepted nasal discharge as a more or less normal condition of the nose. Yet in order that the nose may function, it must not be blocked or its membranes bathed in mucopus. In order that the air be cleansed and moistened, the incoming stream of air must come into intimate and close contact with the membranes of the nostrils. The incidence therefore of nasal discharge regardless of the germ life it contains, is indicative of nasal infection in the vast majority of cases and betokens a more or less functionless organ. These noses are rudimentary, undeveloped, and early show gross evidence of lymphatic breakdown.

Infected tonsils and adenoids sometimes become so large and diseased, they must be removed, because of their mechanical interference with respiration, or because of the large amount of pathologic tissue they represent, but their removal can in no way restore normal function to a crippled and deformed nose, made so largely because of lack of use and early infections.

To the laboratory technician we owe much for our ever-increasing knowledge of infections. With the microscope and X-ray he has set down in no unmistakable language, the result we may expect, and which are usually found in the vital organs of the body once infection has taken place. But valuable as these contributions have been, they do not provide us with means to prevent infections, or draw our attention to the nose as the common source of trouble.

Repeated nasal infections or chronic rhinitis is fraught with far greater menace to health and life than is appreciated. If disease conditions throughout the body are the results of pathologic germ

activity, it is certainly not a debatable question where these germs came from, if at the entrance into the body there is brokendown lymphatic tissue, even though by its chronicity it has become silent and largely painless. Repeated infections are no more normal in the nose than similar conditions elsewhere in the body and are no less dangerous here than elsewhere. With the pharyngoscope these areas can be demonstrated. Impingements and coapted surfaces are always to be found between the turbinates and the septum, or the turbinates themselves, or the turbinates with the lateral wall. Often these structures are packed so tight together that when the softer tissues are shrunken, no separation can be seen.

Nasal surgery, therefore, which has for its object drainage of the parnasal sinuses, gives but fleeting and exceedingly temporary benefit. Likewise the removal of the turbinates of the nasal chambers cannot result in any permanent good, for by their removal nasal function is entirely lost. So that where partial function may have previously existed, even that does not remain. The surgeon's first duty lies not along these lines, except as emergency measures, but his duty is to conserve and to restore nasal function. To the end that air may occupy the paranasal sinuses, and circulate freely and unimpeded, over and about the turbinates of the nose.

So far as our present knowledge goes, this can best be accomplished by a complete submucus resection of the nasal septum, whether it is deviated or not, thus securing ventilation and aeration, at the expense of no functioning tissue or organs. The nose is hereby relieved of a large amount of bone and cartilage, which occupies space much needed for air. With the free circulation of which there is often a fair return to normal function. Turgescence of the nasal membranes will be appreciably reduced, and thereby lessening to a marked extent, the incidence of infective processes within the upper respiratory tract, which are so frequently a traceable etiologic factor of bodily infections. The flow of the lymph is ever toward the heart, under normal as well as abnormal conditions. Its consistency is ever regulated by the pathology through which it flows, and the areas which it serves.

816 Fidelity Building.

CAPILLARY SUCTION AS AN AID IN THE TREATMENT OF EAR, NOSE AND THROAT DISEASES.

Dr. Joseph C. Beck, Dr. Harry L. Pollock,
Dr. Francis L. Lederer, Chicago.

The application of suction in the treatment of diseases about the head and neck has long been carried out but to employ it as a definite therapeutic measure has not been often emphasized. The suction, as employed in our clinic, has been the capillary type and various mechanical devices and forms of capillary tubes are made, depending upon the area to be treated. Medication has been greatly facilitated by the removal of pus and necrotic debris, especially in cavities as are found about the nose, throat, ear, and accessory sinuses, which are ordinarily not easily reached. Modifications of the various types of sinus probes and sounds have been devised so as to facilitate the cleansing of various sinuses.

Excellent results have been obtained by its use in chronic suppurating ears in combination with the dry treatment employed by us. It seems that aside from being a very good cleansing agent, it prevents the usual trauma which is naturally brought about by constant manipulation by swabbing, etc. Furthermore, dry treatment such as this, which avoids trauma and breaking down the defensive mechanism which occurs when fluids (hyper or hypotonic) by means of irrigation are introduced, should be thought of as the treatment par excellence. Then, again, we must appreciate that to introduce fluids to clear away secretions, as is so often advised in the form of douches, one risks the chance of extension of the infection to other sinuses or neighboring parts, whereas suction may be applied under inspection and directly to the part.

The uses which may be found for capillary suction are too numerable to mention and every day one may find an entirely new indication. It has been found to be of excellent benefit in operative work, especially in the smaller and less accessible operative terrains, and avoids the truma, delay and energy which is usually expended in constant sponging, wiping and swabbing.

The type of suction and the instruments for its use have been the cause of much thought and experimentation in our clinic for a num-

Editor's Note: This mss received in The Laryngoscope Office and accepted for publication Nov. 20, 1924.

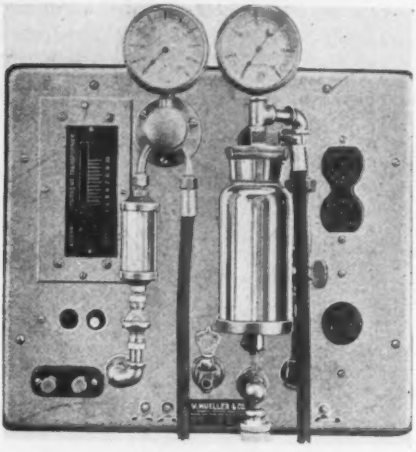

Fig. 1.

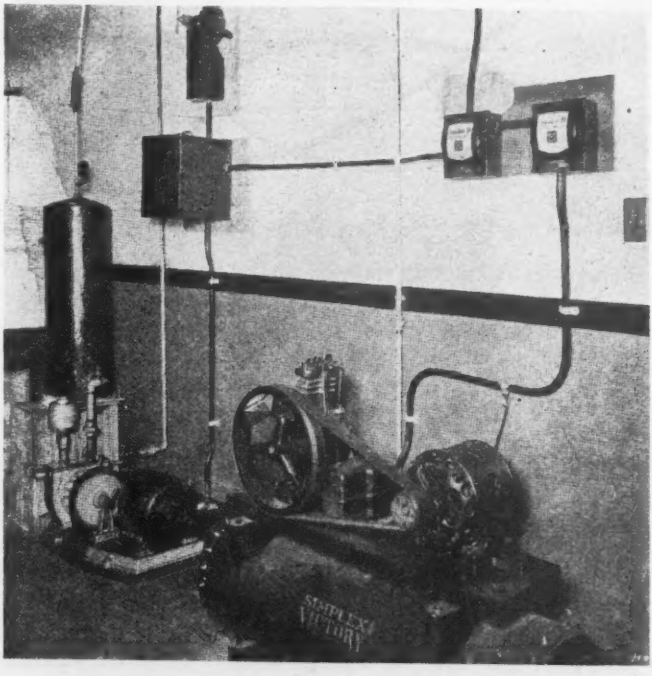

Fig. 2.

ber of years. As a result we have presented on numerous occasions the various instruments and devices which are herein reviewed.

We presented before the American Academy of Ophthalmology and Oto-laryngology, a wall plate that had been installed in our offices and has since that time been in constant use (Fig. 1). The wall plate consists of a suction and air pressure outfit, together with a transformer electric light and gas attachments. It is a compact unit and may be installed in any office. The negative and positive pressure pumps supplying our offices and operating rooms are placed in our basement, far enough away so as to not inconvenience our work by noise (Fig. 2).

We have been advocates, for a number of years, of capillary suction because of the decided advantage of this method over the mass or olive-tip suction. While olive-tip suction is still used by us in

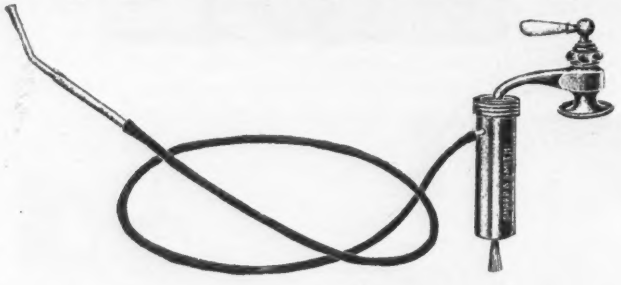

Fig. 3.

selected cases and in some children, we feel that this form of suction may prove injurious in several ways. The traumatism, which may be produced by this mode of employing negative pressure on the tympanic membrane by drawing it inwards, is definitely known. Also this extreme Bier's hyperemia, which this method may produce, is conducive to a serous exudation from the tissues and a drawing in of the mucosa, thereby causing a definite blockage of the meati. Briefly stated—and herein lies our explanation of what we mean by capillary—the capillary method is not a hit or miss affair, being placed directly under inspection, up to the area necessary to be cleansed without causing any feeling of discomfort or producing any congestion of the parts. This form of suction has in no wise proven less practical even in consideration of its home use. For this purpose we have employed a water suction unit consisting of a simple pump attached easily and directly to a water faucet (Fig. 3). Angular metal

suction tips, preferably protected by a rubber tip, may be used by the patient without the usual fear of placing self-medication of this kind into the hands of the patient after detailed instruction. A tip made of fibre silk for use in suppurative ears has proven of utmost value.

After much experimentation with various suction handles for office use, we have finally devised one, we believe, which supports those principles which have bothered us considerably in the use of suction in the past (Fig. 4). This handle is moulded so as to fit conveniently in the hand with the cut-off worked very easily by the thumb. The angle of 45° for the attachment of the various tips, makes a convenient angle for use in the nasal chambers and ears without the inter-

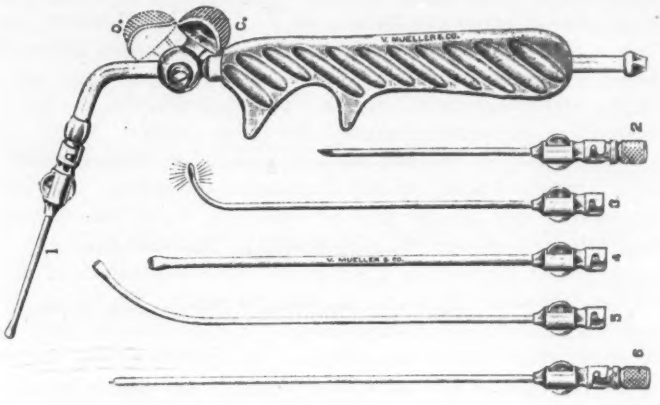

Fig. 4.

ference of the handle in the line of vision. The attachment for the various canulae is of bayonet variety in each of the six metal canulae. There are included in this set one short canula for the ear; a long, large lumen canula; one for the frontal sinus; one for the natural opening of the antrum; and antrum trochar; a long canula and trochar with a blunt end for the sphenoid. This handle and the tips are applicable for irrigation purposes as well as suction.

One cannot overestimate the value of suction over manipulation, particularly in acute diseases about the head. If statistics could be made so complete as to include what procedure was used during the acute infection before the complication set in, it might be definitely demonstrated that much in the way of the sequelae might have been avoided by the use of this carefully planned mechanical procedure.

A TECHNIC FOR SUBMUCUS RESECTION, WITH THE PRESENTATION OF A MEMBRANE ELEVATOR.*

DR. MARVIN F. JONES, New York.

Realizing that the presentation of another septal elevator is far from being a novelty, I still hope that others may try this instrument and find it as useful as I have.

The first model of this instrument was used in 1917. Since that time this elevator has been used by a number of physicians and their comments have encouraged me to present it.

In order to enumerate the uses of this instrument I wish to present a technic for the submucus resection of the nasal septum in which this instrument is used.

The field of operation being thoroughly anesthetized, the patient is placed on the operating table in a semi-prone position. Sterile towels are placed over the table and one moistened in bichlorid of mercury is wrapped firmly around the head of the patient. The nose is prepared with 3½ per cent Tr. iodin and alcohol, this preparation extending inside the anterior nares. The small hairs are cut away so that the view of the internal nose is unobstructed. Four or five thicknesses of gauze are then prepared to cover the patient's face and an opening two inches square is made for the nose. A sterile sheet covers the patient. The instrument tray is "set up" from right to left with the following instruments in order: 1, Freligh modification of Myles nasal speculum; 2, Freer's submucus knife; 3, Jones membrane elevator; 4, Killian elevator; 5, Douglass "hair pin" retractors; 6, Knight's nasal scissors; 7, Ballinger's swivel knife; 8, Demarest nasal forceps; 9, Lutz forceps; 10, nasal dressing forceps.

The nasal speculum is first adjusted so the blades are at right angles to the septum; they are separated as far as possible and then fastened in position. With the knife an incision is made starting one-fourth inch posterior to the mucodermal junction and close to the roof of the nose. This is run parallel to the bridge of the nose through the mucodermal junction into the skin. The next portion of the incision is at right angles to this and is made in the skin parallel to the mucodermal junction. It is then extended to the floor of the nose but not on the floor.

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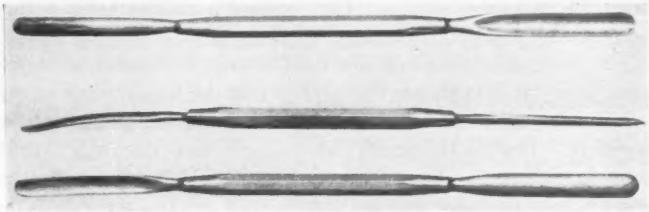
*Presented at the Nose and Throat Clinic of the New York Post-Graduate Medical School and Hospital. Service of Dr. Chas. J. Imperatori.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Oct. 18, 1924.

This incision has the advantage of giving the maximum amount of operation space; leaves a border on the membrane which is not easily torn, heals rapidly without sutures; and does not extend into the area from which bleeding is apt to occur.

The elevation is started at the superior angle by pushing back the mucous membrane and perichondrum. This is a very essential part of the operation. If the cartilage does not show pearly white without a pink shade the perichondrum has not been elevated. The elevation started at the superior angle is then increased until the perichondrum has been separated along the line of incision. The instrument presented in this paper is then inserted parallel to the cartilage and with a progressing "see-saw" movement is forced back parallel to the bridge of the nose until bone is felt. The handle of the instrument is then depressed, which forces the blade to the roof of the nose. It is then withdrawn along the roof. The instrument



is reinserted and with a stroking motion the membrane is elevated to the floor.

The blade of this instrument is fashioned so that the beveled tip combined with a curve makes the elevating surface hug the cartilage, producing elevation in a safe and rapid manner. The dull, rounded tip makes it nearly impossible to force the instrument through the cartilage. It is also difficult to perforate the membrane provided the elevator has been started under the perichondrum. The curve in the blade also retracts the membrane, giving a fair view of the elevation as it progresses.

The operation has now progressed to the point of elevating the second side. To accomplish this an incision is made in the cartilage posterior to the skin incision and parallel to it. This does not go through the cartilage but leaves a groove made by the knife. The tip of the nose is then bent to the opposite side, which fractures the cartilage at the groove and into this groove is inserted a curved, flat, blunt-ended Killian elevator. As the perichondrum on the opposite

side is intact, the elevator slips parallel to the cartilage and begins the elevation with little danger of perforation. The elevation is then continued with the elevator which is presented, using the same technic employed on the first side.

The "hair pin" retractors are then placed on both sides of the cartilage and under the membranes. A small nick is made in the cartilage with the scissors at the upper extremity of the incision. The swivel knife is placed in this nick, forced parallel to the bridge of the nose until it strikes bone. It is then disengaged, the handle lifted and the tip forced downward and backward to the floor. It is then withdrawn along the floor. The cartilage is removed with the scissors, a nick is made in the perpendicular plate of the ethmoid to the depth of one-half inch. Another cut with the scissors is made one inch below this. The object of these cuts is to prevent tension on the cribriform plate of the ethmoid when the bony partition is removed. The removal of the bony partition is accomplished by the use of the Demarest forceps. The superior maxillary spine is then removed with the Lutz forceps.

One of the most frequent and troublesome deformities to correct is the ridge. It is to elevate this portion that the second blade of this double-ended instrument was devised. There are two methods of procedure. One is to elevate below and above the ridge, which leaves the edge attached. The groove in the blade of this instrument fits over the ridge and the rounded end elevates this readily by the simple procedure of pushing it along the ridge from before backward. The other procedure is to remove all the cartilage and allow the ridge to remain. The ridge (if cartilaginous) is then lifted from its bed by using the elevator, concave side up, and at the same time it will separate itself from the attached membrane.

It is my hope that the use of this instrument will result in a more rapid, safe and easier performance of the rather difficult submucous resection of the nasal septum.

40 West 52d Street.

PHILADELPHIA LARYNGOLOGICAL SOCIETY.

October 16, 1924.

New Instruments:

A New Bronchoscopic Powder Insufflator. Dr. Louis H. Clerf.

A Bronchoscopic or Esophagoscopic Specimen Collector. Dr. Louis H. Clerf.

Bronchoscopic Specimen Collector. Dr. Robert M. Lukens.

Bronchoscopic Syringe. Dr. Robert M. Lukens.

Acute Mastoiditis Caused by Streptococci (Hemolyticus and Nonhemolyticus) Associated at Times With Pneumococci. Dr. Philip S. Stout.

Dr. Stout reported four interesting cases of acute mastoiditis. The streptococcus hemolyticus was isolated in three of these cases and the remaining one was a mixed infection of the streptococcus and pneumococcus. His experience has been rather unfortunate as three of these cases terminated fatally. The patient that survived, he operated within forty-eight hours after the onset of the otitis media.

His deductions are that when the blood flows freely after the eardrum is incised, it is invariably a streptococcus hemolyticus infection. In view of the fact that three of his cases terminated by fatality, he urges immediate operation and likens this condition to acute appendicitis.

DISCUSSION.

DR. M. S. ERSNER: In a paper just completed, we made exhaustive studies of the organisms found in acute mastoid disease. We found the streptococcus hemolyticus in 35 per cent of the total cases studied.

Our experiences have been most gratifying and at no time were we alarmed nor had we any cause to be when the streptococcus hemolyticus was found.

We went one step further by closing all the mastoid wounds with the blood clot dressing irrespective of the organisms found.

On Dr. George M. Cotes' service, at the Medico Chi Hospital, we average between 75 and 100 mastoids yearly.

A great deal of blood found after the eardrums are incised may be pathopneumonic of acute mastoiditis and suggestive of streptococcus hemolyticus infection, but, it is not always conclusive. One symptom should, therefore, not be taken as a criterion for mastoid operation.

I have observed that many acute otitis media will clear up without mastoid operation although the infecting organism is the streptococcus hemolyticus; we therefore do not operate immediately and we give the patient the benefit of the doubt. However, if operative procedure is decided upon, we taken into consideration the subjective, objective, local and general symptoms and correlate them with the X-ray and blood findings.

DR. JOSEPH POPPER: The prevention of mastoiditis is naturally more important than its treatment. I believe that many cases are prevented if myringotomy is not performed too early in the course of acute otitis media for the same reason that any surgical incision is best performed when the acute congestive stage is past. On the Pedriatic service of Lebanon Hospital in New York during the past three years myringotomy has been done very unfrequently although about 50 per cent of all admissions have ear infection or develop it. No mastoiditis requiring operation has been seen in any of our cases under continuous observation.

DR. GEORGE MACKENZIE: I do not agree entirely with Dr. Ersner concerning the blood clot dressing. I do, however, agree with him on other

important points. It is possible to have a frank mastoid empyema without pain, swelling of the mastoid, tenderness, fever, middle ear discharge, or other classical symptoms. These atypical cases are particularly dangerous and require careful study. In all cases where the symptoms are masked, we do not want to indulge too long in watchful waiting, but study the case carefully from every possible angle. Labyrinthine involvement, sinus thrombosis and the other intracranial complications in the early congested stage present the symptoms of irritation (hyper-irritability) prior to the development of the suppurative stage when the symptoms are more profound. In the study of every case our object is to uncover the milder symptoms of irritation sufficiently early to forewarn us of the possibility of the more grave consequences later, should we postpone operation until the latter condition has set in. We should also study our cases most carefully for other reasons. In the case of dyscrasias, attention to them will often bring better results than operation on the mastoid alone. I have in mind a case reported before this Society two years ago by Dr. Shemeley in which a boy with hereditary syphilis presented symptoms very suggestive of sinus thrombosis. Dr. Shemeley was on the verge of operating for sinus thrombosis when the syphilis was uncovered by a Wassermann test. Antisyphilitic remedies brought about a prompt cure of all the symptoms suggestive of sinus thrombosis and made unnecessary the operation on the sinus.

I do not agree with the gentleman from New York concerning the incision of the eardrum in cases of middle ear suppuration. It is one of the first principles of surgery that whenever there is pus in an enclosed cavity, the earlier it is opened and drained the better, and this especially applies in cases of drum cavity. In the presence of acute middle ear suppuration we should incise the drumhead *freely*, not only to permit the exit of pus and for the relief of pressure thereby, but also to allow the entrance of air into the cavity and reduce by better aeriation the virulency of the infecting organisms.

DR. J. H. MENDEL: I wish to call your attention to a very early sign in the recognition of acute mastoiditis. I observed it upon two successive cases last winter: one a boy of ten, the other a girl of thirteen—a slight almost imperceptible thickening (rather than a swelling) over the antrum of the affected side evidently due to a beginning periostitis. Both of these children had had a discharging ear for about ten days and were running a temperature of 99 to 100° every afternoon. X-rays were taken and my suspicions were confirmed. They were each operated the day following the reception of the X-ray report. The boy had extensive destruction of the cells and a large extradural abscess—the girl had a sinus exposure at least 3 c.m. in length. Both made an uninterrupted recovery.

I do not think this thickening over the antrum would have been present had the cortex itself been abnormally thick—then again was this sign the very beginning of the classical swelling behind the ear and how much more destruction would have occurred had we waited for the thickening to really become a noticeable swelling?

Neither child complained at any time of pain over the antrum or tip. The absence of pain should not be interpreted to mean that the patient does not have a mastoiditis. Pain whether absent or present is a most unreliable symptom and too much stress should not be laid upon it.

We may as well make up our minds that the only reliable method of diagnosis in these cases of mastoiditis is dependent upon the X-ray and its interpretation by a competent Roentgenologist who is especially skilled in the recognition of the pathological conditions of the mastoid.

I agree with Dr. Stout in being more radical than conservative in opening a drum—nor do I believe in postponing a mastoid operation once you are sure of your diagnosis. I have seen some sad results from waiting too long.

A Comparative Study of the Hearing Tests. Dr. Douglas Macfarlan.

In approaching the subject of the hearing tests I think it is better to talk upon the practical or clinical side than to launch into a consideration of acoustics in general. We should know something of acoustics to understand our hearing tests; unfortunately the average aurist knows little. The subject has to be dug out quietly and laboriously; its knowledge is essential to the ultimate complete understanding of all the phases and many of the contradictory reactions that we find clinically. The book that has helped me most is Dayton C. Miller's science of Musical Sounds. It handles this difficult subject clearly and easily.

However, tonight I hope that without going too deeply into acoustics, there can still be illustrated some comparisons in the different methods in testing hearing.

Probably the earliest test for hearing is the voice test. As a practical test it is excellent, for it tells us to what degree a person hears conversation, and "hearing conversation" is the most important function of the organ of hearing. But as an exact test, as an exact, recordable measure of hearing, the voice test is sadly insufficient. Whether we use the whispered or spoken voice it is impossible to control its intensity. It is impossible to duplicate the same test-voice on subsequent testings. Thus we cannot surely say that this patient hears today 5 or 10 per cent better than he did yesterday. We can only notice the most exaggerated changes, such as we rarely see. Further, the spoken voice is a complex color picture of tones, made up of hundreds of frequencies between 300 and 3,000 double vibrations per second. Each of these tones has an amplitude of its own, thus each varies in intensity. For, intensity is expressed by multiplying the amplitude by the frequency and squaring the result.

In any spoken word there are actually hundreds of tones. The letter "a" alone has been analyzed into sixteen major tones of varying amplitudes. These tones come to the auditory attention en masse. If the patient is deaf to high or low tones he will of course miss many of these tones in the conversation. Yet he may hear sufficient to be able to synthesize words and to make meaning out of what is said. His response to the test will greatly depend upon ability to synthesize sounds and upon tone memories and images. It can be seen that the voice can only with much care be used to differentiate high and low tone deafness. For this purpose single words or vowels of known value can be used, but even then the findings are very gross. I have arrived at this conclusion only after having attempted to make something out of the voice test as either a good qualitative or quantitative measure. The test is so bound up by factors of error, particularly those of the mental or interpretative sphere, that as a test of the pure sensory phenomena of hearing it should not be depended upon. The voice test makes the best interpretation test, but this subject is outside the scope of this talk.

The next test worth considering is Politzer's test, with the little striking hammer that hits a short rod of the vibration frequency of 512. Degree of hearing is determined by distance heard, which method in itself is open to criticism. The test is that of a single tone struck out each time by an identical blow. It is a tone absolutely standard as to intensity, which is a great desideratum, and in which the test differs from the voice, Galton, fork and monochord tests. Singularly it tells us little. If we could depend upon quiet rooms and upon uniform acoustic situations as to walls, hangings, windows, doors, etc., we might make more of the test. Its bone conduction attachment is of no practical value, for AC hearing interferes. The original principle was to test AC over distances, for BC the attachment makes a fixed distance very near the E. A. M.

Another test is the Galton, the whistle for determining high-tone hearing by AC. Here again we have that recurring fault in audition tests, the lack of control of tone intensity. The pitch can be fixed but the amplitude cannot. It is worth mentioning that it is rare to find any two Galtons or Galton-Edelmanns with identical readings.

With ignorant patients and with children it is difficult to have the patient understand that you only want a report on the hearing of the whistle—not the puff.

Of course the instrument is of use only in testing AC.

As a gross test the Galton is of value, its use is rapid and convenient. The examiner should adopt one policy, either starting from audible tones and going to inaudible or visa versa. It matters little which method is selected; with the former, going from audible to inaudible, one is apt to have tone memory and a lower reading.

But in going from inaudible to audible the patient is delayed in response in not knowing exactly what he is expected to hear. There is always the possibility of hearing around the head when high tones are tested. And further it must be remembered that stopping the untested ear increases the hearing in the tested ear.

I will not take up the Koenig cylinders nor the use of the resonators as Sonnenschein suggests, for as yet they are in the laboratory stage. I do want to mention the monochord and would recommend it as a substitute for the Galton. One who has a monochord will soon discard the Galton. Invented by a Hollander, it has become quite popular in foreign clinics, but we hear very little about it here. Lewy, of St. Louis, first mentions it, this is the only notice I have seen of it in this country. He tells me that he is very partial to it and has discarded the whistle.

The instrument as you see it is simple, its principle of excitation is open to the old objection that amplitude cannot be controlled uniformly. For low tone production the wire is stroked with a violin bow; transverse vibrations are produced. For high tones the wire is frictioned longitudinally and longitudinal vibrations are produced. It must be mentioned here that the longitudinal and transverse vibrations are two totally different stimuli, whose only point of resemblance may be pitch. This consideration is most important in the AC and BC testing with forks. From a clinical point of view the transmission of transverse vibrations is excellent by air, very poor by bone conduction; and conversely, longitudinal vibrations are best transmitted by bone conduction and poorly by air conduction.

This instrument gives us a new insight into high tone hearing, for with it we can test both AC and BC. We can take a Weber in the high tones with it. We can see that many cases suspected as having limitation of high tone hearing actually have normal hearing at least to BC and often to both BC and AC. To one who uses the instrument routinely, there will surely come a conviction that there is error in believing that high tone deafness is a common finding in syphilis. I do not want to say that they are wrong who report so often syphilitic high tone deafness. They found poor high tone hearing to the Galton, but were testing AC, and presupposing that BC was likewise affected. This is not always the case.

With the use of the monochord for the Weber, it seems more easy to lateralize than with the forks. This is an important advantage in our unilateral testing of a bilateral system. Forks are usually of comparatively low frequency, with high physical vibration, by which I mean that the transverse vibrations are of such amplitude as to approach tactile perception. (Their longitudinal vibrations are very small and weak.) With low forks of much vibration there is apt to be a confusion between feeling and hearing. In any event, about the highest fork we can use would be the 4012, whereas with the monochord BC can be tested up to the limit of the instrument, 24,000.

In short the monochord can do what the forks do, but at a much higher level; both AC and BC can be tested and the Weber taken. Again, it is most unfortunate that there does not exist a standard, measurable method of exciting the instrument. I use the monochord routinely for testing the high tones to AC and BC; and use the forks for testing the lower and middle ringes. The low transverse monochord vibrations produced by the bow are not easily controlled as to intensity.

The Audiometers. These instruments for the most part are built upon the principle of using the vacuum tube, and the accomplishment sought

is the measurable control of both pitch and amplitude. Such instruments deliver a sound of known intensity which for record purposes is ideal. Like everything human, the audiometers are not perfection, but the idea is right. The greatest shortcoming is that no method of taking bone conduction has been developed with them. It should be said that the audiometers of different makes show different normal curves. This of course is grossly due to the differences in scale, particularly where empirical scales are used as in Guttman's and Bunch's instruments. But the fact remains that even after the translation has been made there is difference in the norm. This means but one thing, that readings with audiometers have to be interpreted just as readings with the forks, whistles or monochord, in the normal of the instrument.

Here are two audiometers, the small one generates a compound tone made up of frequencies between 300 and 3000 d. v. This is the region of greatest hearing acuity as well as the region of speech frequencies. This area is comparable to central vision, while above and below it the comparison is that of the peripheral vision. The instrument is equipped with an intensity control that is graded to read percentages of normal hearing.

The second audiometer gives eight single pitches between 64 and 8192. These are arranged in octaves of C and the tone in each of these pitches can be increased from an inaudible point to one quite loud. A series of charts I have here show that a very graphic picture may be had of the status of hearing in the middle and lower ranges. Only AC can be taken, thus the comparison which we get with the forks, AC and BC, is wanting. On most of these charts I have written the findings with the Galton whistle, with the monochord, and with a very dependable Koenig fork of a pitch 488. You will see by studying the charts individually to what extent the different tests confirm each other. It must be remembered that the test finding with each testing instrument must be valued in the terms of its own normal. What these audiograms show is deafness not uniformly distributed throughout the tonal scale. The more minute the testing the more we see the hearing curve assume peaks and dips. What once were believed to have been islands of deafness are now known to be merely regions or pitches where acuity is poor.

There is this to be said for audiometers—their principle of testing is right—that is, the testing of pitch hearing in the light of pitch amplitudes. The examination with these instruments is rapid and gives a graph that is of great value as a record that may be compared with subsequent records. It is unfortunate that BC cannot be taken.

Finally as to forks. They still should be our mainstay in hearing tests, but they must be used intelligently and carefully. Certain fundamentals must be constantly in mind and testing conditions must be made uniform. To be of real value the tuning fork hearing must be timed; a measured blow must be struck and the normal of the testing fork must be established. The examiner must seek to perform with an unvarying technique, particularly as to holding the fork at the ear or on the bone. Remember tactile sensation in low forks. Remember that with poor forks or careless blows overtones may be produced and heard when the fundamental cannot be heard. Avoid auditory fatigue. Remember the importance of extraneous noises, of the mental sphere—attention, alertness, intelligence, timidity, tone image—and the other effects of the mental and emotional spheres. No two forks are alike, even when of the same pitch, thus records are only of value in the light of the normal of the fork as stated. If your own hearing is not normal nor dependable you cannot use yourself as the normal. Findings with careless technique are often misleading and time is wasted. The tests are not time-consuming as has been often said by those who have not gone into this matter carefully. A lot can be gotten from the tests if we understand them.

Comparisons in findings may be epitomized as follows:

1. None of the instrumental tests give an accurate idea as to what may be the patient's ability to hear speech.

2. The monochord shows that BC is often excellent in syphilitics, and in what are supposed to be nerve deaf cases.

3. The voice test shows that attention, alertness, quick cerebration, and general intelligence play an enormous part in hearing.

4. The audiometers show that there is varying audition for different pitches. They map out a perimetry of hearing.

5. The forks when struck with a definite blow, give the most dependable comparison of the relation of AC to BC.

6. None of these tests should be abandoned but should be used to accumulate evidence toward a more accurate diagnosis.

DISCUSSION.

DR. GEORGE MACKENZIE: The paper we have just heard is very excellent and quite complete. I am pleased to say that the subject of functional hearing tests is becoming popular. If I may be permitted, I will repeat what I said last spring at the St. Louis meeting of the Triological Society concerning the value of audiometers. I do believe that they will eventually become instruments of precision in plotting the fields of hearing. On the other hand, they will not replace the tuning forks. At the present time we are able, with the tuning fork tests, to tell quite accurately the location of the lesion responsible for the loss of hearing. Furthermore, we are able with these tests to recognize mixed forms of deafness which we are unable to do with the audiometers. The recognition of these mixed forms of deafness is very important and upon the correct interpretation of the findings depends our method of treatment. For instance, in a case of mixed form of deafness in which the patient had middle ear catarrh in early life, the treatment of catarrh because of its long standing will avail nothing, whereas, the treatment of the causes of the more recent nerve deafness will accomplish much. On the other hand, if the patient had nerve deafness early in life and should later develop catarrhal deafness, attention to the later appearing (catarrhal deafness) will accomplish more than the treatment of the longer-lasting nerve deafness. Considerably more might be said concerning these mixed forms of deafness which I will not repeat now since I have so recently covered them in a paper on the subject which appeared in the *Eye, Ear, Nose and Throat Monthly*.

DR. T. A. BABBITT: There are three fundamental situations. 1. Acute measurement of hearing before treatment. 2. Accurate measurement of hearing after treatment is started and its progress. 3. Priority of nerve or conduction deafness.

The last test is speech perception and that is what the patient wants. I have often wondered whether some of these ultra scientific tests, although beautiful, do not lose some of their value. The patient wants speech perception and that is what we must approach and improve.

DR. DOUGLAS MACFARLAN: Dr. Mackenzie's remarks on the value of the forks for differential diagnosis cannot be too often reiterated. None of the instruments can take their place; but it is essential in using forks that they be timed. In timing forks, by which is meant, determining how long a fork is heard, there must be struck a standard blow. The variation in fork hearing time when the knee blow is used, should make us abandon this inexact method. Last year I gave you some figures proving this. The pleximeter I use gives very dependable blows of practically always the same intensity. For example, I have a Koenig fork of 448 d. v. which will invariably give 30 seconds BC, 60 seconds AC when struck after this method. For those unfamiliar with forks I would say that no two forks even when of the same pitch can be expected to show identical hearing time. Each fork has its individuality, due chiefly to its internal structure. Do not expect to find a fork that will give the classical time-picture of Alexander, 60 BC, 110 AC. For a number of reasons I prefer a shorter hearing time than this.

I would recommend to those interested in this subject to investigate the valuable discovery of Dr. Mackenzie, the Weber Semabach paradox, a finding confirmed by others.

Dr. Babbitt's remarks on the mental or interpretative side of hearing are most important. I tried to bring out this matter in my paper. As aurists we are interested primarily in the simple sensory phenomena of hearing in what we might call peripheral reception and in the effect of disease on this phase of hearing "central" hearing mental perception or interpretation lies in the domain of psychological investigation, where little progress has been made in putting comparative values on such factors as attention, fatigue and general intelligence.

As hearing tests are such subjective phenomena, it is impossible to separate our investigation of peripheral reception and central perception, for the simple sensory stimuli have to be reported by the patient's interpretation sphere. Variations in mental factors make great differences in the hearing findings. I am in the habit of remarking upon this side of the examination with a note at the head of my sheet, "Patient alert and intelligent", "Patient timid and uncertain", "Intelligence poor, mentally slow", etc. It is unfortunate that we cannot measure these factors exactly, simple test stimuli will greatly reduce their importance, as will careful testing technique.

November 4, 1924.

Paper: Retrobulbar Neuritis Attributed to Sinus Disease; Improvement Following Intranasal Surgery. Report of a Case. Dr. George L. Whelan.

DISCUSSION.

DR. ROSS H. SKILLERN: Gentlemen, it is a pity that this paper was not read before ophthalmologists, because they are the ones who see the patient first, and often when the patient is referred to us, it is too late to do them any good.

I have just read a paper in which there is a criticism on operations on the ethmoids and sphenoids. This paper laid especial stress on the fact that often no pus is found when the ethmoids and sphenoids are opened. It really makes no difference whether anything is found or not, so long as the patient gets well. We have a patient going blind and going very quickly and the longer the operation is postponed the more diminution in vision takes place. We must be alert to the seriousness of the blindness that follows and must spread a propaganda amongst the ophthalmologists that in good hands the operation is simple, without any complications and the end results that we are striving for are attained.

At times when the sphenoids and ethmoids are opened, nothing may be seen but only a few drops of serous fluid. It is this fluid under tension and pressure that produces the retrobulbar neuritis, and after a few days a thick creamy pus appears, it is then that we know that the patient is improving. Again I want to emphasize the importance of operating early in retrobulbar neuritis because when we temporize with this conditon we are playing with dynamite.

Paper: Catarrh or Sinusitis. Dr. Nathan P. Stauffer.

DISCUSSION.

DR. ROBERT F. RIDPATH: Mr. Chairman, I regret that Dr. Stauffer is not present as it is not fair to discuss anyone's paper without the author being present to defend himself.

Gentlemen: The word catarrh should be abandoned, as it does not convey any thought unless qualified by some other term.

Sinusitis means something, especially when prefixed by the name of the sinus involved, *i. e.*, maxillary sinusitis, frontal sinusitis, etc. The word catarrh means nothing.

We must not forget that the mucous membrane of the nose is continuous with the mucous membrane lining the sinuses, and any inflammation of the nose may provoke an acute sinusitis. Those of us who have immunity will throw it off rapidly, while the unlucky one will go on either to subacute or chronic sinusitis. In examining the nose where

the patient complains of dripping in the back part of the throat, we cannot call this catarrh. If there is a postnasal discharge it is due to involvement of the posterior ethmoidal cells or the sphenoids. While profuse discharge anteriorly is due to frontal anterior ethmoidal or maxillary sinusitis.

Paper: Focal Infection as a Factor in the Production of Neurolabyrinthitis. Report of Two Cases. Dr. Wm. G. Shemeley.

DISCUSSION:

DR. DOUGLAS MACFARLAN: Dr. Shemeley's paper is carefully complete with data; but there is so much data that it is difficult to follow with the mental eye. I think that the use of a chart of the Alexander type would set the matter more clearly before us.

One type of neuritis which is not frequently recognized, is that following operative procedures, such as antral punctures and tooth extraction. It is problematical whether this type is purely traumatic or toxic. I have in mind a number of cases in which antral disease had occurred, and where there remained a shadow on transillumination. These patients complained of facial aches which were distinctly neuritis, their trouble was brought on and continued by the repeated punctures made by a success of specialists. It is possible that with tooth extraction, especially where there is curettage, avenues of infection are opened and toxic neuritis follows.

The specific neuritis produced by drugs was well illustrated last year by case reports made before this Society by Drs. Mackenzie and Shemeley, it is not emphasized sufficiently here. I think it is well to ask every deaf patient if he has been under treatment for "rheumatism" or neuritis, or if he has been in the habit of taking asperin, the salicylates, or coal tars—acetanelid, phenacetin or antipyrin. Pohlman and Kranz determined the absolute value of toxic damage that these drugs produced in their poisoning effects on the acoustic nerve. With asperin in double dose, it required a 25 per cent increase in tone intensity to make hearing equivalent to normal, with sodium salicylate in double dose a 75 per cent increase in tone intensity. It is interesting to conjecture upon the selectivity of toxic drugs, whether or not in the case of the eighth nerve the vestibular or auditory branches can be affected independently, and whether or not this is a central or peripheral effect.

In one instance Dr. Shemeley reports the hearing of a higher tone than that of the fork used. I would suggest that this may have been no fault in perception, but the actual hearing of an overtone when the patient was deaf to the fundamental. This I have occasionally found.

I would like to ask Dr. Shemeley (in cases where the pathology has been of some duration) does he find that an accommodation takes place to the vestibular loss, giving subnormal or negative reactions to caloric and turning tests? Does the galvanic test of the labyrinth also give negative findings due to accommodation that takes place centrally? In working with all three tests I feel somewhat convinced that if the disease has existed for even the short period of a few months, accommodation may have so completely developed as to give no subjective symptoms nor objective findings. In considering vestibular records it is well to bear in mind that many cases showing loss will often show periods of aggravation—these periods are usually of short duration, but the reactions found are altogether different from those taken in the quiescent stage.

It is a pleasure to hear a paper gotten up with such care as Dr. Shemeley has given.

DR. HENRY WEIDER: In reference to the treatment of apical abscesses of the teeth, it is said by some authorities not to curette the pyogenic wall as it may cause a diffuse infection instead of a localized.

A thought worth while considering is the work being done by Meyer Solis-Cohen on infections of the rhinopharynx as isolated by the Cohen pathogen selective method or the Heist Lacey method in both of which the whole coaguable blood is used in the test.

DR. BENJAMIN SHUSTER: One of the most striking things about Dr. Shemeley's paper is the thoroughness and painstaking methods he employed in examining his cases. It is all too true that we cannot study cases of deafness too thoroughly. When we find cases for whom everything known is done and without results there certainly must be something which we missed.

One thing is not altogether clear to me and that is how we can say with certainty when a case of deafness is due to a focal infection. Perhaps I have been unable to follow Dr. Shemeley's thought rapidly enough. The average otologist will probably not encounter much difficulty in making a diagnosis of nerve deafness from conductive deafness, but I must say that one is at a loss to say definitely that such and such a case is of a focal infection origin. The labyrinthine tests have not altogether come up to expectations in helping us along these lines. The more we study these tests the more confusing they become, not so much because we cannot grasp them but rather we cannot explain their changeable reactions. For instance, one of the foremost exponents originally claimed that when we get a response from a set of canals in one plane and no response from the canals in the other plane it is pathognomonic of intracranial disease, and yet, recently, he states in a paper that this response is a good sign of acute mastoiditis.

In two two cases reported by Dr. Shemeley, both are cases of deafness, presumably due to focal infection, yet one case gives hyperactive labyrinthine responses, while the other subnormal responses. We might explain this by the fact that the accentuated responses are of an earlier manifestation, therefore more of an irritative than a destructive lesion. Well, one might ask why should there be a hyperactive response of the vestibular portion of the inner ear and a subnormal acoustic response, both being at the same stage of the disease.

This is not the only instance of paradoxical labyrinthine responses, in fact, there are enough instances to shake our confidence in their meaning.

Furthermore, we have all encountered cases that looked like deafness of focal infection, every other cause being eliminated by exclusion, and we do a certain amount of surgical treatment like tonsillectomy, submucous resection, attention to teeth and ethmoids, etc., and with no relief to the patient. Such cases are discouraging and certainly ought to stimulate to further study.

DR. GEORGE W. MACKENZIE: I arrived too late to hear a large part of Dr. Shemeley's paper. I do, however, know its essence.

In all cases of neurolabyrinthitis the history is very important as it will often suggest the etiology. Perhaps even more important is the functional hearing test findings, for it is these that tell us the location of the lesion. When the Weber is lateralized to the better hearing ear, the Schwabach (bone conduction on the mastoid) is shortened, the Rinne, positive or tending that way and there is reduction of hearing, especially for the high tones, we know the trouble is located in the perceptive apparatus. If, in addition to impairment of the hearing function, the patient gives the history of vertigo and equilibrium disturbance with diminishing of the after-turning nystagmus to the two sides, especially toward the affected side, we begin to think of involvement also of the vestibular nerve or vestibular labyrinth, or both, in conjunction with the cochlear nerve, cochlea, or both. Our next procedure is to determine whether the galvanic reaction is positive or negative. If it happens to be positive we locate the lesion in the labyrinth, since the nerve must be intact. If the galvanic reaction happens to be negative we know that the nerve itself is involved and generally the end organ in the labyrinth along with it.

After establishing the diagnosis of neurolabyrinthitis from the above findings, the next move is to determine the cause. They are many. We may conveniently divide them into four groups. 1. The acute infectious fever, including influenza, typhoid fever, scarlet fever, measles, mumps, diphtheria, whooping cough, etc. 2. The chronic infections, syphilis,

tuberculosis, leukemia, leprosy, in fact anything that tends toward the production of granulomatous infiltration. 3. Exogenous poisons, lead, mercury, arsenic mercury, alcohol, ethyl and methyl, tobacco, illuminating gas, salicylates, quinin, the snake poisons, and many other poisons less well known. 4. Endogenous poisons, focal infections, autointoxication from unfavorable intestinal flora.

The history usually will tell us whether the patient has recently had one of the acute infections. Due to acute infections the involvement is usually bilateral and there is a tendency toward complete recovery. Due to one of the causes in the second group we have many things to help us clinically besides the aid of the laboratory. Concerning syphilis in the secondary stage, there is a neurolobyrinthitis with the neuritis predominating and the electrical reaction is negative, or decidedly diminished. As to the congenital form of syphilis, the labyrinth is involved *per se* and the nerve escapes. Therefore, the electrical reaction is preserved. The prognosis is more favorable in the neurolabyrinthitis syphilitica than in the case of labyrinthitis syphilitica tarda. As to the third group, the condition tends to be bilateral. The results are favorable if the cause is determined early and removed. A determination of the cause is made either from the history or by trying out the several poisons that can be produced in minute doses until an aggravation is noted, which establishes the diagnosis of the etiology. The fourth group includes those which may produce neurits elsewhere, namely, rarely focal infections. The teeth and tonsils are the most common sites of the focus; however, it can occur in almost any part of the body. One case I reported several years ago was due to a chronic appendicitis. The surgeon who operated the patient wrote to me that he had operated at least six other cases of the kind. In the cases of neurolabyrinthitis from focal infection origin the lesion is usually unilateral, while all other causes tend to produce bilateral affections.

The subject of neurolabyrinthitis is becoming one of increasing interest, due to its prevalence and the greater ease whereby we can diagnose its presence.

DR. WM. G. SHEMELEY, JR. (closing): In reply to Dr. Douglas Macfarlan, 1, The Alexander Schematic Chart of plotting the tuning fork tests is of great value in the study of a case. If made with careful technique this test will give a clue as to the type of deafness.

2. In the study of focal infection, a system often overlooked by the otolaryngologist is the genitourinary system.

When cases are referred to us for study and we do not find any focal infection in the nose and throat, we must not forget the genitourinary system, pus tubes, seminal vesicalitis and hypertrophied prostrate.

In answer to Dr. Shuster about a variation in labyrinthine responses when they are due to focal infection, this is explained by the fact that in the early stages, the lesion is irritative and it requires less current to elicit response, while in the later or chronic stage with plastic exudate, more current is necessary to produce a reaction.

In answer to Dr. Weider about curettage of root sockets of teeth, I would say that until recently few dentists would attempt to pull a tooth so long as there was pus present. Today the teeth are pulled when there is abscess formation just the same as we incise when an abscess is present in any other part of the body. I believe the time is approaching when the dentist will be a physician who has selected dentistry as his specialty.

December 2, 1924.

Demonstration and Remarks Upon a Modified Adam's Forceps for Occasional Use in the Submucous Operation. Dr. Douglass Macfarlan.

Though we do not admit it, the average rhinologist doing the submucous operation is more or less annoyed when the operation reaches the stage of the removal of the vomer. These facts are true, 1, at this stage the patient's nerves are beginning to get ragged; 2, the anesthesia

may be wearing off; 3, chiselling is mentally distressing to the patient; 4, the vomer is tender; 5, the operator frequently has not a perfect elevation of flaps down to the floor; 6, a flap may be torn and a perforation feared. In this situation, the cartilage having been removed, there is sufficient room above the vomer to insure an excellent functional result from the mere fracturing of the vomer ridge upright. This may or may not be preceded by a few chisel blows to start the fracture line. The Adam's forceps is inserted, a blade in each nostril, outside, not inside the mucous flaps, the point of the instrument is directed down over the ridge and the instrument closed in a firm grasp. The fracture is done by a rotation of the forceps. Care must be used that the blades do not jump up over the vomer ridge and injure the flaps. Little damage is apparently done the mucosa over the vomer by the pressure. I have modified Adam's forceps so that each blade may be inserted separately, like an obstetrical forceps, then clamped after insertion. This I have found necessary in a number of cases in which it was impossible to insert the original model over a large ridge. Further, with the old instrument, the blades when opened for insertion, project out laterally at a 5 to 10 degree angle and strike the lower turbinates, which prevent insertion.

A Simple and Effective Method of Local Tonsillectomy. Dr. Henry Dintenfass.

It should be seen to that no active or acute inflammation of throat exists. Operation can be done at home. The patient to be observed for twenty-four hours. Unless very good reason, no blood clotting time taken. Calcium lactate often of no real value prior to operation. A half hour before the local anesthetic is administered, ¼ morphin sulphate, 1/150 atropin sulphate is given. Patient always operated on in sitting position. The anesthetic solution consists of ½ oz. of ½ of 1 per cent novocain solution. Cocain in any form is not used even to pain the area prior to needle puncture.

Instruments are: An all-metal syringe holding about 2 dr. and fitting into a needle which is ½ in. in length and of the standard screw thread type, having heavy walls of large bore, 18 or 19 gage, and reinforced by a shank. A Harris dissector. A tenaculum of the character of a Kyle or Kirkpatrick, with four rather heavy prongs and the catch removed, in place of which a piece of rubber tubing, slipped on over the joint of the instrument is substituted. A Tyding snare, threaded with a rather heavy piano wire (No. 9). A tongue depressor. A pillar retractor; several Kelly hemostats.

All the instruments sterilized by boiling, including even the needle, in preference to sterilization by immersing in solution like alcohol, lysol, etc. Method of injection is the infiltration anesthesia in which an effort is made to deposit the anesthetic solution directly behind the capsule of the tonsil, in contradistinction to the block anesthesia. The advantages of the former over the latter method are that operation can be begun immediately and the tonsil is being freed from the attachments beneath; usually one injection is all that is necessary. The needle is inserted just below the middle of the tonsil, at a point between tonsil and anterior pillar. In the actual removal the dissection method is used:

The tenaculum and the Tyding snare are held in such a way that the tenaculum goes right through the loop of the snare; the tenaculum takes a firm purchase of the tonsil, putting it on the stretch, making the line of its border stand out prominently and the sharp end of the Harris dissector is tarted from the upper pole of the tonsil between the anterior pillar of the tonsil proper and is carried downward, cutting all the tissues which are seen holding the tonsil. The plica is not saved.

If, in a small percentage of cases, on account of severe previous inflammation, a part of the tonsil, usually the upper pole, will not evert, then the blunt end of the Harris dissector is used with a twisting motion behind the remaing piece.

The application of the snare now follows.

DISCUSSION.

DR. STOUT: Dr. Dintenfass says that after fifteen years there is no contraindication for tonsillectomy under local anesthesia. I desire to say that in advanced tuberculosis of the lungs, especially in cavity formation, tonsillectomy is contraindicated.

I do not agree that it is a one-man operation. There are cases in which we meet unusual conditions and if we have no one to help us we find ourselves in a very unpleasant situation and fatalities may occur.

DR. STROUSE: Is it routine for Dr. Dintenfass to use morphin? I have long since discarded the use of morphin in conjunction with a local anesthesia for it is my belief the toxicity of the latter is thereby increased and I furthermore believe the indications for combining morphin with cocain or novocain should be exceedingly definite.

DR. WEIDER: Dr. Dintenfass' technique has proven satisfactory to me. Dr. Dintenfass has a way of inverting the tonsil that I admire. I have had more bleeding when I have had to cut the upper pole loose with a sharp knife. I have only taken blood clotting time for the past two years to guard against hemophilia. I have had more bleeding with cases showing short clotting time than with those showing a long clotting time. That may be coincidental, as the former greatly predominates.

I believe that calcium lactate is good. I recall a case recently where coagulation time was fifteen minutes and came down to five within a week by administering calcium lactate.

DR. COATES: I should like to ask Dr. Dintenfass why he does not place more faith in clotting time results, and what does he understand to be the difference between clotting time and bleeding time.

It seems to me that there may be a variation in the clotting time, depending upon the anatomical areas from which the blood is taken. In a case recently operated upon at the Medico-Chi Hospital, the resident and technician reported that the blood was not cloting at all, and in their anxiety to prevent a catastrophe the family learned of this. Howevr, I operated just the same and it seemed to me that there was less bleeding than in usual cases.

In regard to the quantity of novocain used, it is the least toxic drug of all local anesthetics that we have. Dr. Dintenfass speaks of the quantity, using 1½ dr. to 2 dr. for a tonsillectomy; he, however, fails to speak of the strength he employs.

DR. LAESSLE: In order to have the minimum amount of hemorrhage, Dr. idpath takes hold of the anterior pillar, makes an incision right back of the anterior pillar, gets the line of cleavage with a dull dissector, runs it upward and downward, takes hold of the upper pole of the tonsil, and draws forward downward until the lower pole is reached, and the snare is applied. Now, this snare is slowly contracted or tightened to give the blood vessels ample time to form a thrombus, thereby reducing hemorrhage to a great extent.

R. DINTENFASS (closing): In answer to Dr. Stout I would say, that while ordinarily it is a risk to operate upon tubercular patients, yet removal of tonsils under local anesthesia has often brought about in these cases remarkable results.

To his other question, it is to be remarked that there is absolutely no reason why an operation of this kind cannot be a one-man job.

In reply to Dr. Coates, according to Harold Hays, of New York, clotting time varies in different parts of the body and also in the different tests made.

Paper: Case of Chronic Purulent Otitis Media With Several Intracranial Complications. Dr. Benjamin H. Shuster.

DISCUSSION.

DR. G. W. MACKENZIE: There seems to be no doubt as to the correctness of the diagnosis in this case. The symptoms and test findings prove that the patient had a destructive labyrinthitis. As soon as one has made the diagnosis of a suppurative labyrinthitis it is safer to operate than not to operate. Furthermore, it is safer not to operate than operate

the mastoid and leave the labyrinth untouched. It has been my privilege to observe a large number of cases: fifty-one in a three-years' experience in Vienna and about thirty-seven of my own cases in this country. In no case where the diagnosis was made and the patient operated promptly was there a fatality. In those cases which were not operated, the mortality was fairly high. Two cases, not my own, where the mastoid was operated and the labyrinth left untouched, both died. The labyrinth, as you know, is in open communication with the intracranial cavity through three performed coutes: the internal auditory canal, the aqueductus cochleae and the aqueductus vestibuli. I have seen a case such as the Doctor reports in oral sphenoidal lobe. There appeared to be no connection between the two processes, but were both probably due to a common cause, namely, caries of the temporal bone. Furthermore, this case of Dr. Shuster's had presented the additional symptoms of a facial paralysis pointing toward bone destruction.

I congratulate Dr. Shuster for his excellent presentation of an interesting case.

DR. WEIDER: I presented this patient to this Society about two years ago. He had T. B. of the larynx. He had absolutely no voice and was despondent. I cauterized about 100 times and eventually larynx cleared up. He had a hoarse voice. He gained weight and did very well, but was neglectful and developed a hemorrhage, after which he went steadily down hill.

I believe this was a T. B. mastoiditis, because he never complained of pain from his otitis media. He had one attack of mastoid irritation while under my care.

DR. SHUSTER (closing): I did not operate in the active stage, because the possibility of the condition being a serous labyrinthitis was not to be overlooked. Later, when acute and threatening symptoms developed on the opposite, I did not feel that patient could stand a radical operation on both sides at the same time.

I did mention briefly that the labyrinthitis reactions were almost *nil* after the subsidence of the attack. If I recall correctly there were about five seconds after-turning nystagmus.

Tic Douloureux Cured by Mastoidectomy. Report of a Case. Dr. Henry S. Wieder.

Wieder's case occurred in a woman 38 years of age, who twelve years previous to her operation, had suffered from an attack of otitis media with apparent recovery, excepting for the fact that she never could lie on the affected side or wear tight hats. Five years later she began to suffer from typical attacks of tic douloureux affecting the mandibular branch of the fifth nerve. It was thought to be due to calcification of the nerves of her lower incisors, which were removed with no relief until the mandibular nerve was injected with alcohol. Following the injection of the mandibular nerve the patient's face was swollen for six weeks and pain began in the other two branches of the trigeminal. These attacks were typical and were increasing in severity and frequency until mastoidectomy was performed in an effort to relieve the tenderness over the mastoid and also relieve the facial pain. X-ray of the mastoid showed what appeared to be absorption of the bone over the lateral sinus.

Operation showed no definite pathology. There was a large cell at the site of the apparent absorption, but it could not be determined whether it was a normal developmental cell or the result of pathological change. It had no contents.

Relief from pain was immediate and permanent. The drooping of the right upper eyelid which accompanied the attacks of pain also disappeared. The patient has been entirely well for eleven months since the operation.

Wieder gives two possible explanations for the association between the ear condition and the tic douloureux and also reports briefly the only two similar cases he has been able to find in the literature.

DR. STOUT: Years ago I had as a patient an old lady who had suffered for a long time with tic douloureux. I could find nothing wrong with her nose, throat, or ears to account for it. She was under the care of a nerve specialist and because of her advanced age nothing was advised surgically. She accidently fell down stairs and was terribly shaken up, but her tic douloureux disappeared, and as far as I know, did not recur again. The nerve specialist was asked of he could account for this and he said he could not.

DR. G. W. MACKENZIE: I wish to call Dr. Weider's attention to the two cases belonging to the same group, which I presented to this Society about two years ago. In both of my cases, however, there was a fluctuating temperature suggestive of thrombophlebitis. I could not for a few minutes put together a severe fifth nerve neuralgia with a temperature curve suggestive of pyemia, until it occurred to me that the superior petrosal sinus lies in close proximity to the Gasserion ganglion on the superior surface of the pyramid near its tip. I fail to grasp the relationship between the third nerve nucleus and the seventh nerve nucleus by way of the posterior longitudinal bundle. The posterior longitudinal bundle connects the nuclei of the vestibular eighth, particularly the Deiters nucleus, with the nuclei of the sixth, fourth and third nerves. The nucleus of the seventh nerve is more ventralward and in the course of its fibres it loops round and over and lateralward of the sixth nerve nucleus and is not in communication directly or indirectly with the posterior longitudinal bundle or the third nerve nucleus in the brain stem.

DR. WEIDER (closing): The third nerve gives off fibres that are connected with those of the seventh nerve. I quote Morris, Obeosteiner and Oppenheim.

J. H., Philadelphia, age 3 years, white, male. Family history: Mother and father living and well. Previous history: No illness. Chief complaint: Swallowed penny. Brought immediately to hospital, Aug. 25, 1924. Began vomiting. Heart and lungs normal. X-ray showed the position of the coin, in the esophagus just below the suparsternal notch. Efforts to remove the coin were made the same day but were futile.

Operation: Aug. 26, 1924, Dr. Stout. With a Jackson's child-size esophageal speculum, combined with the direct fluoroscope examination the penny was easily found and delivered by way of the mouth. Time, less than three minutes. The child left the hospital the next day. Pulse and temperature normal.

Medicine: Bicarb. Soda gr. X, every hour for four doses; also, Morph. gr. $\frac{1}{6}$; At. S. gr. 1/400, Hypd., one hour before operation.

Comment: Doing this operation in the X-ray room with the fluoroscope examination proceeding while the penny was found and grasped made the operation so easy that it was really a delight to do it. The esophageal speculum is one of the most remarkable of all the instruments that Dr. Jackson has devised.

Disadvantages in using the fluoroscope: The room must be pitch dark, which may frighten a child—and it is a little difficult to tell the condition of the child. A small flashlight helps to see the face. Again, you might come in contact with some part of the wiring or the apparatus and get a shock. Suggest not to move around too much in the dark, and have everything ready before turning out the lights.

Advantages in using the fluoroscope: Most foreign bodies in the esophagus are opaque or can be made so to the fluoroscope, so you can see when your speculum gets near the object; therefore, riding over it is not likely to occur—if it starts downward while you are inserting the instrument this also can be seen. You will not spend one-half hour looking for the foreign body that has gone down to the stomach. If there is more than one object this can also be seen. Finally you can see the object come up with the speculum, or, if it slips off, you can see it in its new position.

This is a method that any laryngologist can master and do in the hospital where there is a fluoroscope. No specially trained assistants, except the Roentgenologist, are required.